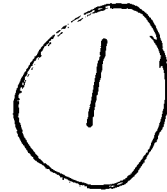


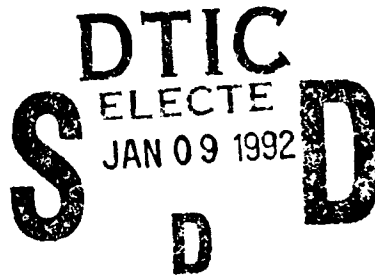
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**SOFTWARE DESIGN DOCUMENT  
SAF Simulation Host CSCI (8)**

Volume 2 of 2 Sections 2.7.1 - 2.15 and Appendices

**June, 1991**



**Prepared by:**

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# REPORT DOCUMENTATION PAGE

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### 2.7.1 remote.c CSC

/simnet/src/host/remote.c

This CSC contains all the code for handling remote vehicles, including some of the stealth code. In addition to the CSUs, there is a constant definition, as shown in the following table.

Constant	Value	Units
MAX TIME OFF ROAD	10000	msecs

**Table 2.7-1: remote.c Constant Definition**

#### 2.7.1.1 create\_remote CSU

This CSU creates a remote vehicle by allocating and initializing a REMOTE\_VARS structure and allocating a SAF object structure. It also initializes the SAF object structure, creating the tick, entity, and vehicle information for that structure.

Parameters		
Parameters	Type	Where Typedef Declared
id	unsigned int	Standard
stealthp	unsigned short	Standard
force	ForceID	basic.h
ReturnValues		
Return Value	Type	Meaning
safobj	pointer to SAF OBJECT	Pointer to remote vehicle
Calls		
Function	Where Described	
allocate_remote	Sec. 2.9.1.2 Appendix A	
allocate_safobj	Sec. 2.2.2.2	
create_tickable	Sec. 2.2.2.2.1	
remote_tick	Sec. 2.7.1.13	
create_entity	Sec. 2.9.2.1.1	
create_vehicle	Sec. 2.9.2.2.1	
init_grid_entry_list	Sec. 2.9.3.1.11	

**Table 2.7-2: create\_remote CSU [8.7.1.1]**



**2.7.1.2 remote\_init\_vars CSU**

This CSU initializes a SAF remote vehicle's state, including REMOTE\_VARS, ENTITY\_VARS, and VEHICLE\_VARS structures.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	SAF_OBJECT	Sec. 2.9.1.1
stealthp	unsigned short	Standard
force	ForceID	basic.h
Calls		
Function	Where Described	
init grid entry list	Sec. 2.9.3.1.11	

**Table 2.7-3: remote\_init\_vars CSU [8.7.1.2]**

**2.7.1.3 remote\_go\_away CSU**

This CSU causes a remote SAF vehicle to completely disappear by destroying all of its structures and any sign of its appearance through a series of calls.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
cancel fncl group	Sec. 2.2.1.1.5	
destroy tickable	Sec. 2.2.2.2.2	
destroy entity	Sec. 2.9.2.1.2	
destroy grid entry list	Sec. 2.9.3.1.13	
destroy vehicle	Sec. 2.9.2.2.2	
buffer deallocate	Sec. 2.14.4.2.14	
deallocate remote	Sec. 2.9.1.2	
deallocate safobj	Sec. 2.2.2.1.2	
unhash saf id		

**Table 2.7-4: remote\_go\_away CSU [8.7.1.3]**

**2.7.1.4 remote\_show CSU**

This CSU determines the state of the remote vehicle and prints that state to the simulation host parser.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
flags	int	Standard

Calls	
Function	Where Described
entity_show	Sec. 2.9.2.1.4
vehicle_show	Sec. 2.9.2.2.4
print_routepoint	Sec. 2.10.2.4.16

Table 2.7-5: remote\_show CSU [8.7.1.4]

### 2.7.1.5 remote\_start\_ticking CSU

This CSU starts the ticking of a remote SAF object. It sets the last update time to zero and calls start\_ticking.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
start_ticking	Sec. 2.2.2.2.3	

Table 2.7-6: remote\_start\_ticking CSU [8.7.1.5]

### 2.7.1.6 remote\_fill\_in\_appearance\_data CSU

This CSU fills out a packet to send to the symbolics telling it about the state of a remote vehicle. It enters entity and vehicle appearance data for a SAF object through calls to entity\_fill\_in\_appearance\_data and vehicle\_fill\_in\_appearance\_data. It then determines and enters the vehicle's status and sets the vehicle's tactics to zero.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
desc_ptr	pointer to VEHICLE_APPEARANCE_DESCRIPTOR	Sec. 2.4.1.1
Calls		
Function	Where Described	
entity_fill_in_appearance_data	Sec. 2.9.2.1.6	
vehicle_fill_in_appearance_data	Sec. 2.9.2.2.6	
is_dead	Sec. 2.13.3.1	

Table 2.7-7: remote\_fill\_in\_appearance\_data CSU [8.7.1.6]

**2.7.1.7 remote\_fill\_echelon\_data CSU**

This CSU fills in the VEHICLE\_ECHELON\_DESCRIPTOR in the VAP packet to be sent to the symbolics structure elements job\_desc, port\_number, and superior\_id to zero and echelon to g\_vehicle\_echelon.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
desc_ptr	pointer to VEHICLE_ECHELON_DESCRIPTOR	Sec. 2.4.1.1

**Table 2.7-8: remote\_fill\_in\_echelon\_data CSU [8.7.1.7]**

**2.7.1.8 remote\_fill\_in\_position\_data CSU**

This CSU fills in the remote SAF vehicle's position descriptor through calls to entity\_fill\_in\_position\_data and vehicle\_fill\_in\_position\_data.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
desc_ptr	pointer to VEHICLE_POSITION_DESCRIPTOR	Sec. 2.4.1.1
Calls		
Function	Where Described	
entity fill in position data	Sec. 2.9.2.1.6	
vehicle fill in position data	Sec. 2.9.2.2.5	

**Table 2.7-9: remote\_fill\_in\_position\_data CSU [8.7.1.8]**

**2.7.1.9 remote\_next\_road\_point CSU**

This CSU returns the next road point toward which a remote SAF vehicle is heading, if the vehicle is on a road.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
ReturnValues		
Return Value	Type	Meaning
NULL	pointer to ROUTEPOINT	Vehicle not on road
remote->last_road_point	pointer to ROUTEPOINT	Last point on road of vehicle

Calls	
Function	Where Described
remote_start_being_watched	Sec. 2.7.1.10
OBJ_VELOCITY	Sec. 2.9.1.1
abs	Sec. 2.13.3.2
OBJ_DIRECTION	Sec. 2.9.1.1
next_road_point	Sec. 2.12.1.15.5
heap_allocate	Sec. 2.14.2.1.1
vec_sub	Sec. 2.6.2.65.1 Vehicles CSCI SDD
vec2_dot	Sec. 2.14.3.5.24

Table 2.7-10: remote\_next\_road\_point CSU [8.7.1.9]

**2.7.1.10 remote\_start\_being\_watched CSU**

This CSU starts watching a SAF remote vehicle by setting the tick rate, setting the REMOTE\_VARS being\_watched element to TRUE, and setting its last\_watched\_at time to the current time.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
change_tick_rate	Sec. 2.2.2.2.5	

Table 2.7-11: remote\_start\_being\_watched CSU [8.7.11]

**2.7.1.11 remote\_stop\_being\_watched CSU**

This CSU stops watching a SAF remote vehicle by setting the tick rate to the normal tick rate (in the REMOTE\_VARS structure) and setting the REMOTE\_VARS being\_watched element to FALSE.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
change_tick_rate	Sec. 2.2.2.2.5	

Table 2.7-12: remote\_stop\_being\_watched CSU [8.7.1.11]

**2.7.1.12 remote\_new\_appearance CSU**

This CSU receives an appearance packet from a remote SAF vehicle.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
spdu	pointer to SimulationPDU	p_sim.h
Calls		
Function	Where Described	
buffer_deallocate	Sec. 2.14.4.2.13	
buffer_up_refcnt	Sec. 2.14.4.2.16	

**Table 2.7-13: remote\_new\_appearance CSU [8.7.1.12]**

**2.7.1.13 remote\_tick CSU**

This CSU updates a SAF remote vehicle, based on information in an appearance packet. If the remote vehicle is a stealth, its position is sent to the workstation if that workstation is controlling it.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Errors		
Error Name	Reason for Error	
ERROR_OUT	Remote has unexpected packet in receive queue	
ERROR_OUT	Appearance of unknown vehicle class	
Calls		
Function	Where Described	
tickable note start tick	Sec. 2.2.2.2.6	
remote stop being watched	Sec. 2.7.1.11	
buffer simple dequeue	Sec. 2.14.4.2.19	
remote deactivate	Sec. 2.7.1.15	
buffer simple flush	Sec. 2.14.4.1.16	
ERROR_OUT	Sec. 2.5.2.2	
OBJ_VEHICLEID	Sec. 2.9.1.1 See Appendix A	
buffer deallocate	Sec. 2.14.4.2.14	
vec copy	Sec. 2.6.2.59.1 Vehicles CSCI SDD	
icon from object type	Sec. 2.4.3.1.9	
get soil type	Sec. 2.14.1.2.1	
update grid entry list	Sec. 2.9.3.1.12	
fmat to rmat	Sec. 2.14.3.5.16	
copy matrix row to vector	Sec. 2.14.3.5.18	
change tick rate	Sec. 2.2.2.2.5	
broadcast pae data	Sec. 2.4.3.2.74	
broadcast appearance data	Sec. 2.4.3.2.73	
buffer allocate	Sec. 2.14.4.2.12	
fill sbx opfor_header	Sec. 2.4.3.2.18	
s_atan2	Sec. 2.14.3.9 See Appendix A	
sbx_connection_send_to_port	Sec. 2. 4.3.2.19	
buffer deallocate	Sec. 2.14.4.2.14	

**Table 2.7-14: remote\_tick CSU [8.7.1.13]**

**2.7.1.14 send\_stealth\_gone\_msg CSU**

This CSU informs the workstation controlling a stealth that the stealth has left the network.

Parameters		
Parameters	Type	Where Typedef Declared
port	int	Standard

Calls	
Function	Where Described
buffer allocate	Sec. 2.14.4.2.12
fill_sbx_opfor_header	Sec. 2.4.3.2.18
sbx_connection_send_to_port	Sec. 2.4.3.2.19
buffer_deallocate	Sec. 2.14.4.2.15

Table 2.7-15: send\_stealth\_gone\_msg CSU [8.7.1.14]

## 2.7.1.15 remote\_deactivate CSU

This CSU sets the appropriate parameters of a remote vehicle when that vehicle becomes deactivated.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
DEBUG_REMOTE	Sec. 2.5.2.2	
send_stealth_gone_msg	Sec. 2.7.1.14	
sbx_printf	Sec. 2.4.3.2.8	
RETYPE_VEHICLE	Sec. 2.9.3.2	
destroy_grid_entry_list	Sec. 2.9.3.1.13	
FOR_VEHICLES_DO	Sec. 2.9.3.2	
remove_vehicles	Sec. 2.14.1.1.5	
stop_ticking	Sec. 2.2.3.4	
broadcast_vehicle_is_gone	Sec. 2.4.3.2.75	
buffer_deallocate	Sec. 2.14.4.2.15	

Table 2.7-16: remote\_deactivate CSU [8.7.1.15]

## 2.7.1.16 remote\_change\_stealth\_controlling\_port CSU

This CSU checks to see if the remote SAF stealth vehicle is currently connected to a controlling port and if the port is different from the new one assigned. If so, the CSU sends a message to the old remote port that the stealth vehicle has left that workstation and assigns the vehicle to its new controlling port.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
send_stealth_gone_message	Sec. 2.7.1.14	
sbx_printf	Sec. 2.4.3.2.8	

Table 2.7-17: remote\_change\_stealth\_controlling\_port CSU [8.7.1.16]

**2.7.1.17 create\_remote\_vehicle CSU**

This CSU checks if an inactive remote SAF vehicle exists. If it does, the CSU initializes it. If it does not, the CSU creates it. In either case, the CSU then starts it ticking and returns a pointer to it.

Parameters		
Parameters	Type	Where Typedef Declared
spdu	pointer to SimulationPDU	p_sim.h
id	unsigned int	Standard
stealthp	unsigned int	Standard
ReturnValues		
Return Value	Type	Meaning
safobj	pointer to SAF OBJECT	Points to remote SAF vehicle
Calls		
Function	Where Described	
LOOKUP_VEHICLE	Sec. 2.9.3.2	
DEBUG_REMOTE	Sec. 2.5.2.2	
RETYPE_VEHICLE	Sec. 2.9.3.1	
remote_init_vars	Sec. 2.7.1.2	
create_remote	Sec. 2.7.1.1	
remote_start_ticking	Sec. 2.7.1.5	

Table 2.7-18: create\_remote\_vehicle CSU [8.7.1.17]



## 2.8 UNITS CSC

The Units CSC simulates the organizational structure of the simulated forces (the local vehicles). The vehicles are organized into a hierarchy containing entities such as platoons, companies, and flights. The units code is called by the SAF command interface to distribute unit commands down to the subunits and the vehicles. When called by the scheduler, it updates unit positions based on vehicle positions, processes packets delivered to it, generates unit reports, determines the status of units, and interprets orders.

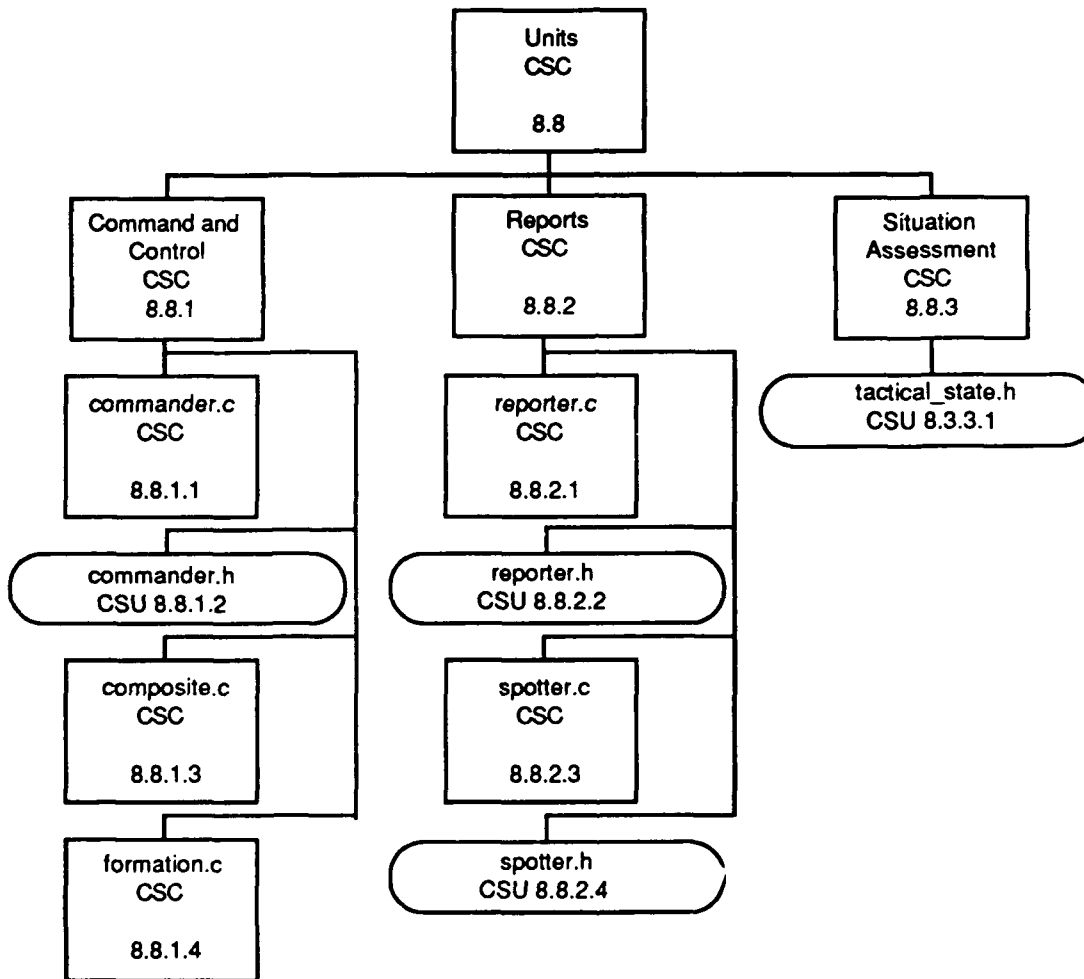


Figure 2.8-1: Units CSC Structure

### 2.8.1 Command and Control CSC

The Command and Control CSC [8.8.1] contains three CSCs and a CSU which handle the following responsibilities: commander.c [8.8.1.1] provides instructions for composite vehicles; commander.h [8.8.1.2] is the header CSU for commander.c; composite.c [8.8.1.3] organizes groups of vehicles and other composites; and formation.c [8.8.1.4] places individual vehicles into their proper formation positions.

### 2.8.1.1 commander.c CSC

/simnet/src/host/commander.c

The code in this CSC is the source of composite vehicle instructions. In any composite, there is one vehicle (the "leading\_vehicle") which is in control of what all of the other vehicles are doing (unless sub units have been told to perform other tasks). This vehicle is the "brain" of a composite. When a composite is told what to do through immediate interventions or combat instruction sets, the information is retained in this vehicle's driver or pilot state, and in the composite's commander variable, and the other vehicles obtain their information from there. The code for switching the leading vehicle of a composite also resides in this CSC.

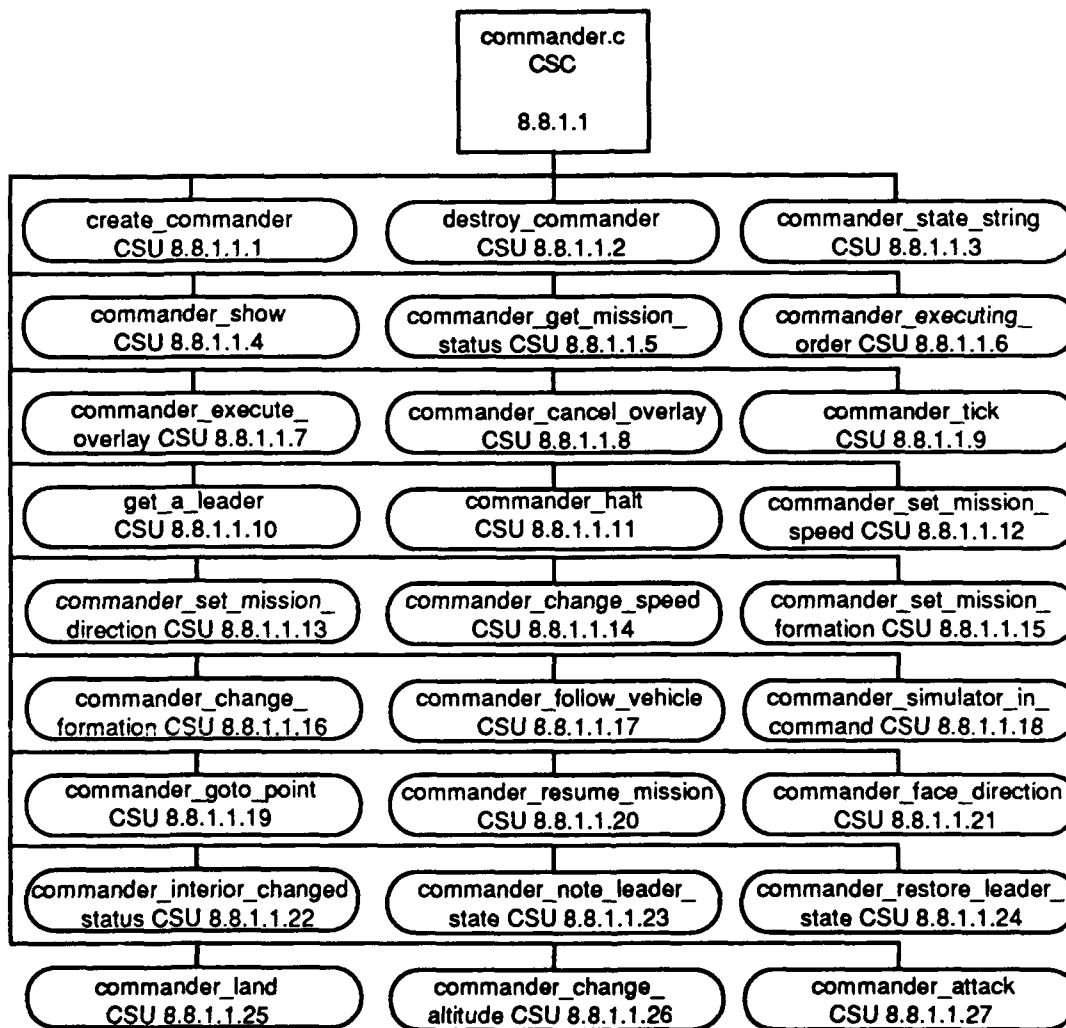


Figure 2.8-2: commander.c CSC Structure

**2.8.1.1.1 create\_commander CSU**

This CSU allocates memory to build a **COMMANDER\_VARS** structure, initializes its elements, and returns a pointer to the commander.

ReturnValues		
Return Value	Type	Meaning
commander	pointer to <b>COMMANDER_VARS</b>	Sec. 8.9.1.2 veh_storage.h
Calls		
Function	Where Described	
allocate commander	Sec. 2.9.1.2 See Appendix A	

**Table 2.8-1: create\_commander CSU [8.8.1.1.1]**

**2.8.1.1.2 destroy\_commander CSU**

This CSU calls **deallocate\_commander** to release the commander's memory.

Parameters		
Parameters	Type	Where Typedef Declared
commander	pointer to <b>COMMANDER_VARS</b>	Sec. 8.9.1.2 veh_storage.h
Calls		
Function	Where Described	
deallocate commander	Sec. 2.9.1.2 See Appendix A	

**Table 2.8-2: destroy\_commander CSU [8.8.1.1.2]**

**2.8.1.1.3 commander\_state\_string CSU**

This CSU converts a commander state token into a character string, returning a pointer to the string.

Parameters		
Parameters	Type	Where Typedef Declared
state	unsigned short	Standard
ReturnValues		
Return Value	Type	Meaning
"idle"	Pointer to char	Commander state
"executing mission"	Pointer to char	Commander state
"immediate intervention"	Pointer to char	Commander state
"unknown"	Pointer to char	Unknown token

**Table 2.8-3: commander\_state\_string CSU [8.8.1.1.3]**

**2.8.1.1.4 commander\_show CSU**

This CSU displays the commander's state.

Parameters		
Parameters	Type	Where Typedef Declared
commander	pointer to COMMANDER_VARS	Sec. 8.9.1.2 veh_storage.h
Calls		
Function	Where Described	
commander_state_string	Sec. 2.8.1.1.3	

**Table 2.8-4: commander\_show CSU [8.8.1.1.4]**

**2.8.1.1.5 commander\_get\_mission\_status CSU**

This CSU creates a character string buffer for displaying that contains the commander's state and the leading and useable subordinate vehicles in the commander's composite.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
ReturnValues		
Return Value	Type	Meaning
buf	pointer to char	Created buffer
Calls		
Function	Where Described	
saf_vehicle_useless	Sec. 2.6.1.1.41	

**Table 2.8-5: commander\_get\_mission\_status CSU [8.8.1.1.5]**

**2.8.1.1.6 commander\_executing\_order CSU**

This CSU determines if the commander's state is not idle.

Parameters		
Parameters	Type	Where Typedef Declared
command	pointer to COMMANDER_VARS	Sec. 8.9.1.2 veh_storage.h
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Commander state not idle.
FALSE	int	Commander state idle.

**Table 2.8-6: commander\_executing\_order CSU [8.8.1.1.6]**

**2.8.1.1.7 commander\_execute\_overlay CSU**

This CSU sets state variables in the commander to indicate that an overlay is being executed. The leading vehicle is then assigned a route to follow, and the other available vehicles are instructed to follow the leading vehicle.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
overlay	pointer to OVERLAY	Sec. 2.10.2.2
cm	pointer to CONTROL_MEASURE	2.10.2.2
Errors		
Error Name	Reason for Error	
ERROR_OUT	Cannot execute anything but route cm.	
Calls		
Function	Where Described	
ERROR_OUT	Sec. 2.5.2.2 See Appendix A	
get a leader	Sec. 2.8.1.1.10	
composite note leader state	Sec. 2.8.1.3.36	
saf_vehicle useless	Sec. 2.6.1.1.41	
saf_vehicle_reset_station_keeper	Sec. 2.6.1.1.51	
saf_vehicle set route	Sec. 2.6.1.1.48	
compcsite_inferior_changed_status	Sec. 2.8.1.3.37	

**Table 2.8-7: commander\_execute\_overlay CSU [8.8.1.1.7]**

**2.8.1.1.8 commander\_cancel\_overlay CSU**

The CSU sets the commander state variables to indicate that the overlay should no longer be executed. It then calls a similar function on the leading vehicle, instructing it to stop moving.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
saf_vehicle_cancel_overlay	Sec. 2.6.1.1.47	
composite note leader state	Sec. 2.8.1.3.36	
composite_inferior_changed_status	Sec. 2.8.1.3.37	

**Table 2.8-8: commander\_cancel\_overlay CSU [8.8.1.1.8]**

**2.8.1.1.9 commander\_tick CSU**

Upon a tick, this CSU checks if the commander's state is executing a mission. The return is TRUE if a mission is being executed, and FALSE otherwise. If a mission is being executed, the CSU calls check\_predicates, which checks if any behaviors have been triggered.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Commander executing mission.
FALSE	int	Commander not executing mission.
Calls		
Function	Where Described	
check_predicates	Sec. 2.10.1.3.13	

Table 2.8-9: commander\_tick CSU [8.8.1.1.9]

**2.8.1.1.10 get\_a\_leader CSU**

This CSU checks if there is a leader, and if no leader exists, it tries to assign one.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
ReturnValues		
Return Value	Type	Meaning
TRUE	int	There is a leader.
FALSE	int	No leader.
Calls		
Function	Where Described	
composite_note_leader_state	Sec. 2.8.1.3.36	
composite_reassign_current_formation	Sec. 2.8.1.3.27	
DEBUG COMPOSITE	Sec. 2.5.2.2 See Appendix A	

Table 2.8-10: get\_a\_leader CSU [8.8.1.1.10]

**2.8.1.1.11 commander\_halt CSU**

This CSU triggers a halt TAC/E which causes the leading vehicle to temporarily suspend movement.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
type	int	Standard
Calls		
Function	Where Described	
get a leader	Sec. 2.8.1.1.10	
saf_vehicle_stop_mimicing	Sec. 2.6.1.1.19	
composite_note_leader_state	Sec. 2.8.1.3.36	
saf_vehicle_useless	Sec. 2.6.1.1.41	
saf_vehicle_reset_station_keeper	Sec. 2.6.1.1.51	
pilot_hold_im	Sec. 2.6.4.2.76	
saf_vehicle_halt	Sec. 2.6.1.1.52	
composite_inferior_changed_status	Sec. 2.8.1.3.37	

**Table 2.8-11: commander\_halt CSU [8.8.1.1.11]**

**2.8.1.1.12 commander\_set\_mission\_speed CSU**

This CSU sets the speed of the leading SAF vehicle if it is able to find one.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
speed	REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
FALSE	int	No leader
saf_vehicle_set_speed(...)	int	Set the speed.
Calls		
Function	Where Described	
get a leader	Sec. 2.8.1.1.10	
saf_vehicle_set_speed	Sec. 2.6.1.1.49	

**Table 2.8-12: commander\_set\_mission\_speed CSU [8.8.1.1.12]**

**2.8.1.1.13 commander\_set\_mission\_direction CSU**

This CSU sets the direction of the leading SAF vehicle if it is able to find one.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
direction	int	Standard
Calls		
Function	Where Described	
get a leader	Sec. 2.8.1.1.10	
saf_vehicle_set_direction	Sec. 2.6.1.1.50	

**Table 2.8-13: commander\_set\_mission\_direction CSU [8.8.1.1.13]**

**2.8.1.1.14 commander\_change\_speed CSU**

This CSU changes the speed of the leading SAF vehicle if it is able to find one, along with all useable member vehicles.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
speed	REAL	sim_types.h
Calls		
Function	Where Described	
get a leader	Sec. 2.8.1.1.10	
saf_vehicle_change_speed	Sec. 2.6.1.1.53	
saf_vehicle_useless	Sec. 2.6.1.1.41	

**Table 2.8-14: commander\_change\_speed CSU [8.8.1.1.14]**

**2.8.1.1.15 commander\_set\_mission\_formation CSU**

This CSU changes the formation which is to be used while executing an overlay. If the mission formation is not currently overridden, the formation of the unit is changed to the new value. The return value indicates whether such a change was made.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
formation	pointer to char	Standard
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Formation changed.
FALSE	int	Formation not changed.



Calls	
Function	Where Described
composite note leader state	Sec. 2.8.1.3.36
composite assume formation	Sec. 2.8.1.3.26
composite_inferior_changed_status	Sec. 2.8.1.3.37

Table 2.8-15: commander\_set\_mission\_formation CSU [8.8.1.1.15]

## 2.8.1.1.16 commander\_change\_formation CSU

This CSU overrides the current formation of the unit, imposing the passed value.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
formation	pointer to char	Standard

Calls	
Function	Where Described
composite note leader state	Sec. 2.8.1.3.36
composite assume formation	Sec. 2.8.1.3.26
composite_inferior_changed_status	Sec. 2.8.1.3.37

Table 2.8-16: commander\_change\_formation CSU [8.8.1.1.16]

## 2.8.1.1.17 commander\_follow\_vehicle CSU

This CSU causes the leading vehicle to start following the indicated vehicle. All available members of the unit will continue to follow the leading vehicle.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
vid	unsigned int	Standard
xoff	int	Standard
yoff	int	Standard

Calls	
Function	Where Described
saf_vehicle_stop_mimicing	Sec. 2.6.1.1.19
composite note leader state	Sec. 2.8.1.3.36
saf_vehicle_useless	Sec. 2.6.1.1.41
saf_vehicle_reset_station_keeper	Sec. 2.6.1.1.51
saf_vehicle_follow_vehicle	Sec. 2.6.1.1.54
composite_inferior_changed_status	Sec. 2.8.1.3.37

Table 2.8-17: commander\_follow\_vehicle CSU [8.8.1.1.17]

**2.8.1.1.18 commander\_simulator\_in\_command CSU**

This CSU causes the leading vehicle to mimic the passed vehicle (disappear from the Simnet and do exactly what the simulator does).

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
vid	unsigned int	Standard
Calls		
Function	Where Described	
get a leader	Sec. 2.8.1.1.10	
composite note leader state	Sec. 2.8.1.3.36	
saf_vehicle_useless	Sec. 2.6.1.1.41	
saf_vehicle_reset_station_keeper	Sec. 2.6.1.1.51	
saf_vehicle_mimic_vehicle	Sec. 2.6.1.1.18	
composite_inferior_changed_status	Sec. 2.8.1.3.37	

**Table 2.8-18: commander\_simulator\_in\_command CSU [8.8.1.1.18]**

**2.8.1.1.19 commander\_goto\_point CSU**

This CSU sends the leading vehicle to a point.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
x	REAL	sim_types.h
y	REAL	sim_types.h
backwardp	int	Standard
Calls		
Function	Where Described	
get a leader	Sec. 2.8.1.1.10	
saf_vehicle_stop_mimicing	Sec. 2.6.1.1.19	
composite note leader state	Sec. 2.8.1.3.36	
saf_vehicle_useless	Sec. 2.6.1.1.41	
saf_vehicle_reset_station_keeper	Sec. 2.6.1.1.51	
saf_vehicle_goto_point	Sec. 2.6.1.1.55	
composite_inferior_changed_status	Sec. 2.8.1.3.37	

**Table 2.8-19: commander\_goto\_point CSU [8.8.1.1.19]**

**2.8.1.1.20 commander\_resume\_mission CSU**

This CSU causes the termination of any outstanding TAC/Es and override formation, and restores the commander state to its value before the TAC/E started (possibly relinquishing control of its member vehicles back to its superior unit).

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
saf_vehicle_stop_mimicing	Sec. 2.6.1.1.19	
saf_vehicle_useless	Sec. 2.6.1.1.41	
saf_vehicle_resume_mission	Sec. 2.6.1.1.56	
composite_note_leader_state	Sec. 2.8.1.3.36	
composite_inferior_changed_status	Sec. 2.8.1.3.37	
composite_assume_formation	Sec. 2.8.1.3.26	
pop_resumable_cis	Sec. 2.10.1.1.13	

**Table 2.8-20: commander\_resume\_mission CSU [8.8.1.1.20]**

**2.8.1.1.21 commander\_face\_direction CSU**

This CSU causes the leading vehicle to face a direction, and in the case of air vehicles, it causes other vehicles to do so as well.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
mathradians	REAL	sim_types.h
Calls		
Function	Where Described	
get_a_leader	Sec. 2.8.1.1.10	
saf_vehicle_stop_mimicing	Sec. 2.6.1.1.19	
composite_note_leader_state	Sec. 2.8.1.3.36	
saf_vehicle_useless	Sec. 2.6.1.1.41	
saf_vehicle_reset_station_keeper	Sec. 2.6.1.1.51	
saf_vehicle_face_direction	Sec. 2.6.1.1.57	
composite_inferior_changed_status	Sec. 2.8.1.3.37	

**Table 2.8-21: commander\_face\_direction CSU [8.8.1.1.21]**

**2.8.1.1.22 commander\_inferior\_changed\_status CSU**

This CSU is called when a member of a composite becomes available or unavailable. The CSU reassigns the current formation, adjusting all of the member vehicles.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
composite_inferior_changed_status	Sec. 2.8.1.3.37	
composite_reassign_current_formation	Sec. 2.8.1.3.27	

**Table 2.8-22: commander\_inferior\_changed\_status CSU [8.8.1.1.22]**

**2.8.1.1.23 commander\_note\_leader\_state CSU**

This CSU makes a copy of the current leader state so it can be restored to a new leader, if necessary. If this unit is inactive, this message is passed up the hierarchy.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
composite note leader state	Sec. 2.8.1.3.36	

**Table 2.8-23: commander\_note\_leader\_state CSU [8.8.1.1.23]**

**2.8.1.1.24 commander\_restore\_leader\_state CSU**

This CSU restores the currently saved leader state to a new leading vehicle. If this unit is inactive, this message is passed up the hierarchy.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
saf_vehicle stop mimicing	Sec. 2.6.1.1.19	
saf_vehicle mimic vehicle	Sec. 2.6.1.1.18	

**Table 2.8-24: commander\_restore\_leader\_state CSU [8.8.1.1.24]**

**2.8.1.1.25 commander\_land CSU**

This CSU causes the leading air vehicle to land. Other available member vehicles will do as the leading vehicle does.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
x	REAL	sim_types.h
y	REAL	sim_types.h
Calls		
Function	Where Described	
get a leader	Sec. 2.8.1.1.10	
composite note leader state	Sec. 2.8.1.3.36	
pilot_land im	Sec. 2.6.4.2.70	
saf_vehicle_useless	Sec. 2.6.1.1.41	
saf_vehicle_reset_station_keeper	Sec. 2.6.1.1.51	
composite_inferior_changed_status	Sec. 2.8.1.3.37	

**Table 2.8-25: commander\_land CSU [8.8.1.1.25]**

**2.8.1.1.26 commander\_change\_altitude CSU**

This CSU changes the altitude of all available member vehicles.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
altitude	REAL	sim_types.h
Calls		
Function	Where Described	
saf_vehicle_useless	Sec. 2.6.1.1.41	
pilot_change_altitude im	Sec. 2.6.4.2.66	

**Table 2.8-26: commander\_change\_altitude CSU [8.8.1.1.26]**

**2.8.1.1.27 commander\_attack CSU**

This CSU computes the necessary vectors to perform the specific attack profile, and then causes the available units to execute this profile. Each vehicle is given its own separate route to attack based on its own relative position in the formation.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
popup_x	REAL	sim_types.h
popup_y	REAL	sim_types.h
target_x	REAL	sim_types.h
target_y	REAL	sim_types.h
Calls		
Function	Where Described	
get a leader	Sec. 2.8.1.1.10	
vec2_set	Sec. 2.14.3.5.21	
vec2_sub	Sec. 2.14.3.5.21	
vec2_mag2	Sec. 2.14.3.5.27	
OBJ POSITION	Sec. 2.9.1.1 See Appendix A	
vec2_copy	Sec. 2.14.3.5.29	
OBJ DIRECTION	Sec. 2.9.1.1 See Appendix A	
vec2_norm	Sec. 2.14.3.5.31	
composite note leader state	Sec. 2.8.1.3.36	
saf_vehicle useless	Sec. 2.6.1.1.41	
pilot get asm	Sec. 2.6.4.2.84	
p follower get wrld offset	Sec. 2.6.4.3.7	
pilot hoverattack im	Sec. 2.6.4.2.75	
composite_inferior_changed_status	Sec. 2.8.1.3.37	

Table 2.8-27: commander\_attack CSU [8.8.1.1.27]

### 2.8.1.2 commander.h CSU

/simnet/src/host/commander.h

This CSU contains the state symbolic constants for the commander.

Constant	Value
COMMANDER STATE IDLE	1
COMMANDER STATE EXECUTING MISSION	2
COMMANDER STATE IMMEDIATE INTERVENTION	3

Table 2.8-28: commander.h Constant Definitions

### 2.8.1.3 composite.c CSC

/simnet/src/host/composite.c

Composites are used to organize groups of vehicles or other composites. They allow a single command or request for a change to be given to entire units or groups of vehicles, simplifying the task of the person running the vehicles from the workstation. Composites

"move" around the database, taking their sub composites and vehicles with them. (The composite location is the location of the lead vehicle of that composite, or the lead vehicle of the lead composite, etc).

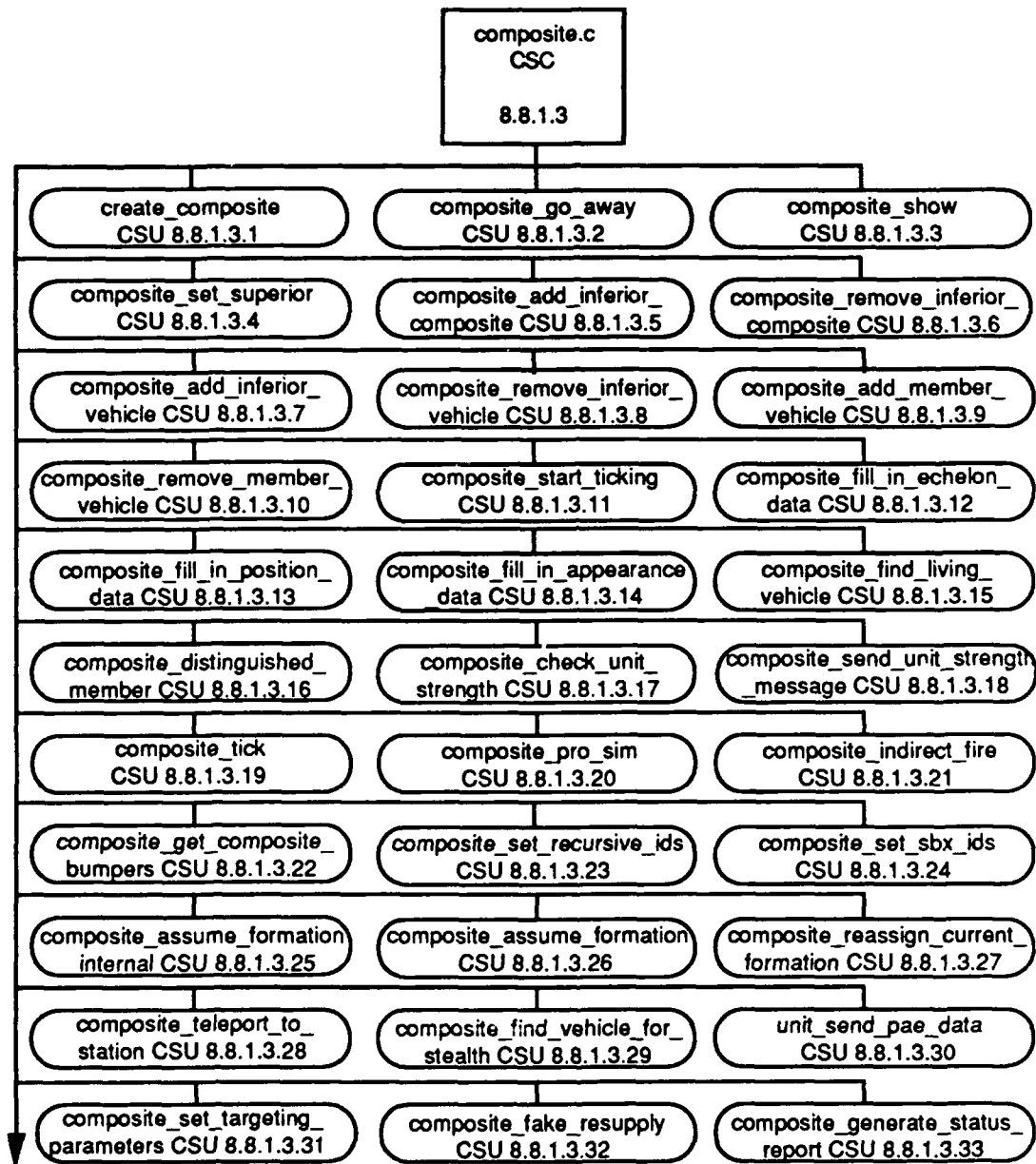
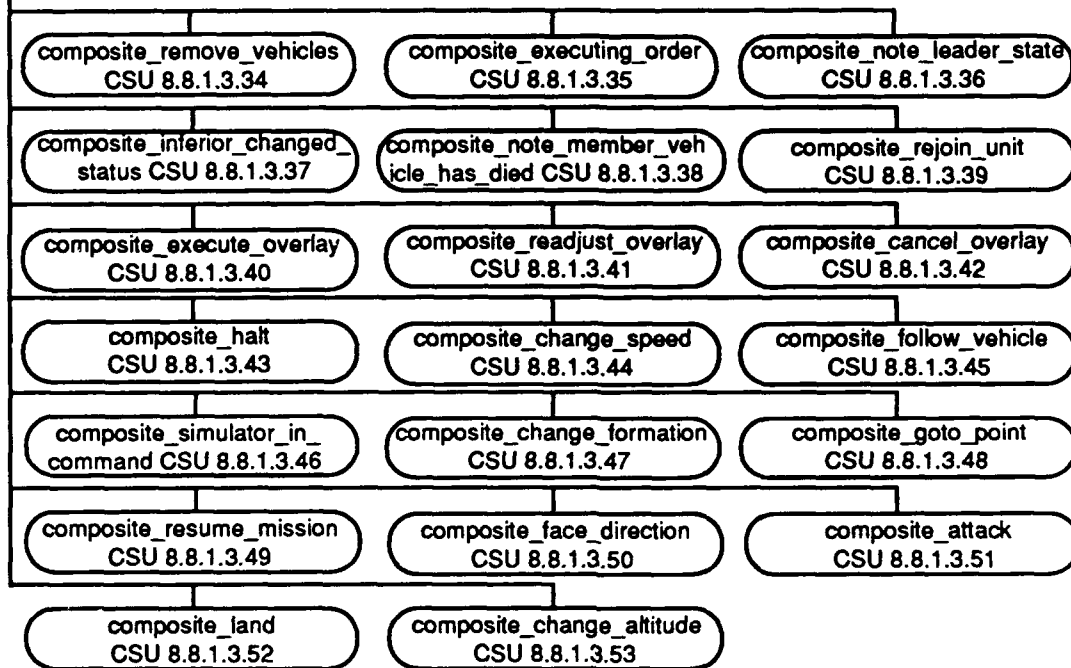


Figure 2.8-3: composite.c CSC Structure Part 1 of 2



**Figure 2.8-4: composite.c CSC Structure Part 2 of 2**

This CSC contains all of the main composite CSUs. It creates and destroys composites, adds and subtracts inferiors and superiors in the vehicle/composite hierarchy, sets up the echelon configuration for the composite (see data files echelons), sets up positions relative to other vehicles in the composite and sub composites (see data files formations), initiates composite status reporting, and sets up the starting points for dealing with combat instruction sets and immediate interventions.

#### 2.8.1.3.1 create\_composite CSU

This CSU allocates memory to store the composite, and allocates all component objects. It also initializes formation and CIS databases, and other composite variables.

Parameters		
Parameters	Type	Where Typedef Declared
forceID	ForceID	basic.h
tactics	unsigned char	Standard
echelon	pointer to char	Standard
echelon_type	pointer to char	Standard
heading	REAL	sim_types.h
position	pointer to REAL	sim_types.h
owner	pointer to SBX_CONNECTION_VARS	Sec. 2.4.3.3



ReturnValues		
Return Value	Type	Meaning
safobj	pointer to SAF_OBJECT	Composite created.
Calls		
Function	Where Described	
composite_tick	Sec. 2.8.1.3.19	
generate_vehicle_id		
allocate_composite	Sec. 2.9.1.2 See Appendix A	
map_echelon_symbol_to_echelon_number	Sec. 2.4.3.1.3	
find_tag	Sec. 2.1.1.4.3	
create_predicates	Sec. 2.10.1.3.1	
ft_untagged_table	Sec. 2.14.1.2.15	
allocate_safobj	Sec. 2.2.2.2	
create_tickable	Sec. 2.2.3.1	
create_entity	Sec. 2.9.2.1.1	
map_echelon_type_symbol_to_icon_number	Sec. 2.4.3.1.7	
create_spotter	Sec. 2.8.2.3.1	
create_reporter	Sec. 2.8.2.1.1	
create_commander	Sec. 2.8.1.1.1	
create_navigator	Sec. 2.10.2.3.1	

Table 2.8-29: create\_composite CSU [8.8.1.3.1]

## 2.8.1.3.2 composite\_go\_away CSU

This CSU frees composite object memories and releases the use of its vehicle id.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
cancel_fnci_group	Sec. 2.2.1.1.5	
destroy_tickable	Sec. 2.2.3.2	
destroy_entity	Sec. 2.9.2.1.2	
destroy_spotter	Sec. 2.8.2.3.2	
destroy_reporter	Sec. 2.8.2.1.2	
destroy_cis	Sec. 2.10.1.1.9	
destroy_predicates	Sec. 2.10.1.3.2	
deallocate_composite	Sec. 2.9.1.2 See Appendix A	
deallocate_safobj	Sec. 2.2.2.3	
unhash_saf_id		

Table 2.8-30: composite\_go\_away CSU [8.8.1.3.2]

**2.8.1.3.3 composite\_show CSU**

This CSU displays the composite statistics.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
flags	int	Standard
Calls		
Function	Where Described	
entity show	Sec. 2.9.2.1.4	
spotter show	Sec. 2.8.2.3.12	
reporter show	Sec. 2.8.2.1.4	
navigator show	Sec. 2.10.2.3.3	
OBJ VEHICLEID	Sec. 2.9.1.1 See Appendix A	
print vehicle marking	Sec. 2.9.2.2.3	
commander show	Sec. 2.8.1.1.4	
cis show	Sec. 2.10.1.1.10	
predicates show	Sec. 2.10.1.3.9	

**Table 2.8-31: composite\_show CSU [8.8.1.3.3]**

**2.8.1.3.4 composite\_set\_superior CSU**

This CSU removes the composite from its current hierarchy and reassigns it to a new hierarchy.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
superior	pointer to SAF OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
DEBUG COMPOSITE	Sec. 2.5.2.2 See Appendix A	
OBJ VEHICLEID	Sec. 2.9.1.1 See Appendix A	
composite_remove_inferior_composite	Sec. 2.8.1.3.6	
composite_add_inferior_composite	Sec. 2.8.1.3.5	

**Table 2.8-32: composite\_set\_superior CSU [8.8.1.3.4]**

**2.8.1.3.5 composite\_add\_inferior\_composite CSU**

This CSU adds a new composite to an existing hierarchy.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
inferior	pointer to SAF OBJECT	Sec. 2.9.1.1

**Table 2.8-33: composite\_add\_inferior\_composite CSU [8.8.1.3.5]**

**2.8.1.3.6 composite\_remove\_inferior\_composite CSU**

This CSU removes a composite and its member vehicles from an operational hierarchy.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
inferior	pointer to SAF OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
DEBUG COMPOSITE	Sec. 2.5.2.2 See Appendix A	
OBJ VEHICLEID	Sec. 2.9.1.1 See Appendix A	
composite_remove_member_vehicle	Sec. 2.8.1.3.10	

**Table 2.8-34: composite\_remove\_inferior\_composite CSU [8.8.1.3.6]**

**2.8.1.3.7 composite\_add\_inferior\_vehicle CSU**

This CSU adds a vehicle to a composite's inferior list.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
vehicle	pointer to SAF OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
composite_add_member_vehicle	Sec. 2.8.1.3.9	

**Table 2.8-35: composite\_add\_inferior\_vehicle CSU [8.8.1.3.7]**

**2.8.1.3.8 composite\_remove\_inferior\_vehicle CSU**

This CSU removes a vehicle from a composite's inferior list.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
vehicle	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
DEBUG_COMPOSITE	Sec. 2.5.2.2 See Appendix A	
OBJ_VEHICLEID	Sec. 2.9.1.1 See Appendix A	
composite_remove_member_vehicle	Sec. 2.8.1.3.10	

**Table 2.8-36: composite\_remove\_inferior\_vehicle CSU [8.8.1.3.8]**

**2.8.1.3.9 composite\_add\_member\_vehicle CSU**

This CSU adds a vehicle to a composite's member list.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
vehicle	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
composite_add_member_vehicle	Sec. 2.8.1.3.9	

**Table 2.8-37: composite\_add\_member\_vehicle CSU [8.8.1.3.9]**

**2.8.1.3.10 composite\_remove\_member\_vehicle CSU**

This CSU removes a vehicle from the composite's member list.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
vehicle	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
DEBUG_COMPOSITE	Sec. 2.5.2.2 See Appendix A	
OBJ_VEHICLEID	Sec. 2.9.1.1 See Appendix A	
composite_remove_member_vehicle	Sec. 2.8.1.3.10	

**Table 2.8-38: composite\_remove\_member\_vehicle CSU [8.8.1.3.10]**

**2.8.1.3.11 composite\_start\_ticking CSU**

This CSU causes a composite to start ticking by making a call to start\_ticking.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
start_ticking	Sec. 2.2.3.3	

**Table 2.8-39: composite\_start\_ticking CSU [8.8.1.3.11]**

**2.8.1.3.12 composite\_fill\_in\_echelon\_data CSU**

This CSU fills in an echelon data structure for transmission to the workstations.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
desc_ptr	pointer to VEHICLE_ECHELON_DESCRIPTOR	Sec. 2.4.1.1
Calls		
Function	Where Described	
OBJ_VEHICLEID	Sec. 2.9.1.1 See Appendix A	

**Table 2.8-40: composite\_fill\_in\_echelon\_data CSU [8.8.1.3.12]**

**2.8.1.3.13 composite\_fill\_in\_position\_data CSU**

This CSU fills in a position data structure for transmission to the workstations.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
desc_ptr	pointer to VEHICLE_POSITION_DESCRIPTOR	Sec. 2.4.1.1
Calls		
Function	Where Described	
entity_fill_in_position_data	Sec. 2.9.2.1.5	

**Table 2.8-41: composite\_fill\_in\_position\_data CSU [8.8.1.3.13]**

**2.8.1.3.14 composite\_fill\_in\_appearance\_data CSU**

This CSU fills in an appearance data structure for transmission to the workstations.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
desc_ptr	pointer to VEHICLE_APPEARANCE_DESCRIPTOR	Sec. 2.4.1.1
Calls		
Function	Where Described	
entity_fill_in_appearance_data	Sec. 2.9.2.1.6	

Table 2.8-42: composite\_fill\_in\_appearance\_data CSU [8.8.1.3.14]

**2.8.1.3.15 composite\_find\_living\_vehicle CSU**

This CSU finds a living vehicle in a composite, if there are any.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
ReturnValues		
Return Value	Type	Meaning
NULL	pointer to SAF_OBJECT	No composite vehicles.
composite->member_vehicles[i]	pointer to SAF_OBJECT	Living vehicle found.
composite->member_vehicles[0]	pointer to SAF_OBJECT	No living vehicle found.

Table 2.8-43: composite\_find\_living\_vehicle CSU [8.8.1.3.15]

**2.8.1.3.16 composite\_distinguished\_member CSU**

This CSU finds the leading vehicle in a composite, and if one does not exist, it finds any living vehicle.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
ReturnValues		
Return Value	Type	Meaning
safobj->composite->leading_vehicle	pointer to SAF_OBJECT	Leading vehicle found.
composite_find_living_vehicle(...)	pointer to SAF_OBJECT	No leading vehicle, so look for a living vehicle.

Calls	
Function	Where Described
composite_find_living_vehicle	Sec. 2.8.1.3.15

Table 2.8-44: composite\_distinguished\_member CSU [8.8.1.3.16]

## 2.8.1.3.17 composite\_check\_unit\_strength CSU

This CSU determines a unit's percentile of living vehicles as a function of member vehicles and, if it is below 50% (either less than 50% or less than 25%), sends a message to the owner through a call to composite\_send\_unit\_strength\_message.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
composite_send_unit_strength_message	Sec. 2.8.1.3.18	

Table 2.8-45: composite\_check\_unit\_strength CSU [8.8.1.3.17]

## 2.8.1.3.18 composite\_send\_unit\_strength\_message CSU

This CSU sends a message from a top level unit to the owner that the unit strength is below a certain percentile.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
percent	int	Standard
Calls		
Function	Where Described	
sbx_printf	Sec. 2.4.3.2.8	
OBJ_VEHICLEID	Sec. 2.9.1.1 See Appendix A	
OBJ_OWNER_PORT_NUMBER	Sec. 2.9.1.1 See Appendix A	

Table 2.8-46: composite\_send\_unit\_strength\_message CSU [8.8.1.3.18]

**2.8.1.3.19 composite\_tick CSU**

At the tick, this CSU checks if the previous leading vehicle is still the leading vehicle. It updates the previous leading vehicle to the present one if the previous one was not the same or was NULL. Note that the present leading vehicle may be NULL or may be making the previous leading vehicle NULL. If there are vehicles, the CSU does the commander tick. If there are living vehicles, it does the spotter and reporter ticks, as well as performs a check of unit strength. Next, if the commander is executing a mission, it does the navigator tick. Lastly, it checks for any packets in the receive queue, and digests them.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
composite_distinguished_member	Sec. 2.8.1.3.16	
DEBUG STATION	Sec. 2.5.2.2 See Appendix A	
OBJ_VEHICLEID	Sec. 2.9.1.1 See Appendix A	
vec copy	Sec. 2.6.2.59.1 Vehicle CSCI SDD	
OBJ_POSITION	Sec. 2.9.1.1 See Appendix A	
commander tick	Sec. 2.8.1.1.9	
spotter tick	Sec. 2.8.2.3.7	
reporter tick	Sec. 2.8.2.3.7	
composite_check_unit_strength	Sec. 2.8.1.3.17	
navigator tick	Sec. 2.10.2.3.6	
buffer simple dequeue	Sec. 2.14.4.1.15	
OBJ_SIMPLE_RCVQ	Sec. 2.9.1.1 See Appendix A	
composite_pro_sim	Sec. 2.8.1.3.20	
buffer deallocate	Sec. 2.14.4.2.15	

Table 2.8-47: composite\_tick CSU [8.8.1.3.19]

**2.8.1.3.20 composite\_pro\_sim CSU**

This CSU examines the type of message received and, if it is an indirect fire type, calls composite\_indirect\_fire. If the message is of any other recognized type, it is ignored. If the message type is unrecognizable, it labels it as a bad packet type in an ERROR\_OUT message.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
spdu	pointer to SimulationPDU	p_sim.h
Errors		
Error Name	Reason for Error	
ERROR_OUT	Bad packet type.	



Calls	
Function	Where Described
composite_indirect_fire	Sec. 2.8.1.3.21
ERROR_OUT	Sec. 2.5.2.2 See Appendix A
OBJ_VEHICLEID	Sec. 2.9.1.1 See Appendix A

Table 2.8-48: composite\_pro\_sim CSU [8.8.1.3.20]

## 2.8.1.3.21 composite\_indirect\_fire CSU

This CSU computes the position for all impending bursts and calls cluster\_shell for each one.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
spdu	pointer to SimulationPDU	p_sim.h
Calls		
Function	Where Described	
cluster_shell	Sec. 2.8.2.1.39	

Table 2.8-49: composite\_indirect\_fire CSU [8.8.1.3.21]

## 2.8.1.3.22 composite\_get\_composite\_bumpers CSU

This CSU sets the composite marking field by taking all common elements of its inferiors.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
composite_get_composite_bumpers	Sec. 2.8.1.3.22	

Table 2.8-50: composite\_get\_composite\_bumpers CSU [8.8.1.3.22]

## 2.8.1.3.23 composite\_set\_recursive\_ids CSU

This CSU assigns each member composite of a unit a number unique within that unit.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
top_id	unsigned char	Standard
rel_id	unsigned char	Standard

ReturnValues		
Return Value	Type	Meaning
rel_id	unsigned char	Recursive id number.
Calls		
Function	Where Described	
composite set recursive ids	Sec. 2.8.1.3.23	

Table 2.8-51: composite\_set\_recursive\_ids CSU [8.8.1.3.23]

## 2.8.1.3.24 composite\_set\_sbx\_ids CSU

This CSU assigns each member vehicle of a unit a number unique within that unit.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
sbx_uniq_id	unsigned char	Standard
Calls		
Function	Where Described	
composite set recursive ids	Sec. 2.8.1.3.23	

Table 2.8-52: composite\_set\_sbx\_ids CSU [8.8.1.3.24]

## 2.8.1.3.25 composite\_assume\_formation\_internal CSU

This CSU obtains the desired vehicle positions for a formation, and assigns each vehicle its position.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
formation	pointer to char	Standard
Calls		
Function	Where Described	
get station info	Sec. 2.8.1.4.10	
OBJ VEHICLEID	Sec. 2.9.1.1 See Appendix A	
DEBUG COMPOSITE	Sec. 2.5.2.2 See Appendix A	
saf vehicle set leader	Sec. 2.6.1.1.5	
turret set scan parms	Sec. 2.6.9.6.8	

Table 2.8-53: composite\_assume\_formation\_internal CSU [8.8.1.3.25]

**2.8.1.3.26 composite\_assume\_formation CSU**

This CSU causes a composite to assume formation through calls to `commander_note_leader_state`, `composite_assume_formation_internal`, and `commander_restore_leader_state`.

Parameters		
Parameters	Type	Where Typedef Declared
<code>safobj</code>	pointer to SAF_OBJECT	Sec. 2.9.1.1
<code>formation</code>	pointer to char	Standard
Calls		
Function	Where Described	
<code>commander_note_leader_state</code>	Sec. 2.8.1.1.23	
<code>composite_assume_formation_internal</code>	Sec. 2.8.1.3.25	
<code>commander_restore_leader_state</code>	Sec. 2.8.1.1.24	

**Table 2.8-54: composite\_assume\_formation CSU [8.8.1.3.26]**

**2.8.1.3.27 composite\_reassign\_current\_formation CSU**

This CSU reassigns the current composite formation through calls to `composite_assume_formation_internal` and `commander_restore_leader_state`.

Parameters		
Parameters	Type	Where Typedef Declared
<code>safobj</code>	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
<code>composite_assume_formation_internal</code>	Sec. 2.8.1.3.25	
<code>composite_restore_leader_state</code>	Sec. 2.8.1.1.24	

**Table 2.8-55: composite\_reassign\_current\_formation CSU [8.8.1.3.27]**

**2.8.1.3.28 composite\_teleport\_to\_station CSU**

For each of the member vehicles of a composite, this CSU calls `saf_vehicle_teleport_to_station`.

Parameters		
Parameters	Type	Where Typedef Declared
<code>safobj</code>	pointer to SAF_OBJECT	Sec. 2.9.1.1

Calls	
Function	Where Described
saf_vehicle_teleport_to_station	Sec. 2.6.1.1.6

Table 2.8-56: composite\_teleport\_to\_station CSU [8.8.1.3.28]

## 2.8.1.3.29 composite\_find\_vehicle\_for\_stealth CSU

This CSU finds a vehicle for stealth attachment through a call to composite\_find\_living\_vehicle.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
ReturnValues		
Return Value	Type	Meaning
composite_find_living_vehicle(...)	pointer to SAF_OBJECT	Living vehicle, if any.
Calls		
Function	Where Described	
composite_find_living_vehicle	Sec. 2.8.1.3.15	

Table 2.8-57: composite\_find\_vehicle\_for stealth CSU [8.8.1.3.29]

## 2.8.1.3.30 unit\_send\_pae\_data CSU

This CSU causes a PAE packet regarding all vehicles in a unit to go out.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
broadcast_pae_data	Sec. 2.4.3.2.74	
OBJ_VEHICLEID	Sec. 2.9.1.1 See Appendix A	
unit_send_pae_data	Sec. 2.8.1.3.30	

Table 2.8-58: unit\_send\_pae\_data CSU [8.8.1.3.30]

**2.8.1.3.31 composite\_set\_targeting\_parameters CSU**

This CSU calls saf\_vehicle\_set\_targeting\_parameters for each of the composite member vehicles.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
firestatus	int	Standard
max_engagement_range	REAL	sim_types.h
marksmanship	REAL	sim_types.h
position_x	REAL	sim_types.h
position_y	REAL	sim_types.h
radius	REAL	sim_types.h
targets[ ]	unsigned short	Standard
Calls		
Function	Where Described	
saf_vehicle_set_targeting_parameters	Sec. 2.6.1.1.12	

**Table 2.8-59: composite\_set\_targeting\_parameters CSU [8.8.1.3.31]**

**2.8.1.3.32 composite\_fake\_resupply CSU**

This CSU calls saf\_fake\_resupply for each of the composite member vehicles.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
saf_vehicle_fake_resupply	Sec. 2.6.1.1.33	

**Table 2.8-60: composite\_fake\_resupply CSU [8.8.1.3.32]**

**2.8.1.3.33 composite\_generate\_status\_report CSU**

This CSU generates a status report of the composite for the user at a workstation.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1

Calls	
Function	Where Described
commander_executing_order	Sec. 2.8.1.1.6

Table 2.8-63: composite\_executing\_order CSU [8.8.1.3.35]

## 2.8.1.3.36 composite\_note\_leader\_state CSU

This CSU calls commander\_note\_leader\_state.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
commander_note_leader_state	Sec. 2.8.1.1.23	

Table 2.8-64: composite\_note\_leader\_state CSU [8.8.1.3.36]

## 2.8.1.3.37 composite\_inferior\_changed\_status CSU

This CSU calls commander\_inferior\_changed\_status.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
commander_inferior_changed_status	Sec. 2.8.1.1.22	

Table 2.8-65: composite\_inferior\_changed\_status CSU [8.8.1.3.37]

## 2.8.1.3.38 composite\_note\_member\_vehicle\_has\_died CSU

This CSU informs itself that a member vehicle has died, reducing the number of living vehicles, and then informs the vehicle's superior through a call to itself.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
dead_inferior	pointer to SAF_OBJECT	Sec. 2.9.1.1

Calls	
Function	Where Described
buffer allocate	Sec. 2.14.4.2.12
clear weapons status	Sec. 2.6.9.8.11
is dead	Sec. 2.13.3.1 See Appendix A
OBJ APPEARANCE	Sec. 2.9.1.1 See Appendix A
OBJ VEHICLECLASS	Sec. 2.9.1.1 See Appendix A
add weapons status	Sec. 2.6.9.8.12
OBJ POSITION	Sec. 2.9.1.1 See Appendix A
tdb giv_xy_get utm	Sec. 2.21.7.24.3
commander_get_mission_status	Sec. 2.8.1.1.5
fill sbx opfor header	Sec. 2.4.3.2.18
OBJ VEHICLEID	Sec. 2.9.1.1 See Appendix A
sbx_connection_send_to_port	Sec. 2.4.3.2.19
buffer deallocate	Sec. 2.14.4.2.15

Table 2.8-61: composite\_generate\_status\_report CSU [8.8.1.3.33]

## 2.8.1.3.34 composite\_remove\_vehicles CSU

This CSU removes vehicles known to the spotter and/or reporter through calls to spotter\_remove\_vehicles and reporter\_remove\_vehicles.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
num	int	Standard
v_list[ ]	unsigned int	Standard
Calls		
Function	Where Described	
spotter_remove_vehicles	Sec. 2.8.2.3.6	
reporter_remove_vehicles	Sec. 2.8.2.1.3	

Table 2.8-62: composite\_remove\_vehicles CSU [8.8.1.3.34]

## 2.8.1.3.35 composite\_executing\_order CSU

This CSU is an access point to commander\_executing\_order.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
ReturnValues		
Return Value	Type	Meaning
commander_executing_order (...)	int	Normal end.

Calls	
Function	Where Described
composite_note_member_vehicle_has_died	Sec. 2.8.1.3.38

**Table 2.8-66: composite\_note\_member\_vehicle\_has\_died CSU [8.8.1.3.38]**

#### 2.8.1.3.39 composite\_rejoin\_unit CSU

This CSU calls composite\_cancel\_overlay.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
composite_cancel_overlay	Sec. 2.8.1.3.42	

**Table 2.8-67: composite\_rejoin\_unit CSU [8.8.1.3.39]**

#### 2.8.1.3.40 composite\_execute\_overlay CSU

This CSU mission command is accomplished through calls to navigator\_set\_overlay and commander\_execute\_overlay.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
overlay	pointer to OVERLAY	Sec. 2.10.2.2
cm	pointer to CONTROL_MEASURE	Sec. 2.10.2.2
Calls		
Function	Where Described	
navigator set overlay	Sec. 2.10.2.3.4	
commander execute overlay	Sec. 2.8.1.1.7	

**Table 2.8-68: composite\_execute\_overlay CSU [8.8.1.3.40]**



**2.8.1.3.41 composite\_readjust\_overlay CSU**

This CSU mission command is accomplished through a call to navigator\_reset\_overlay.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
overlay	pointer to OVERLAY	Sec. 2.10.2.2
Calls		
Function	Where Described	
navigator_reset_overlay	Sec. 2.10.2.3.5	

**Table 2.8-69: composite\_readjust\_overlay CSU [8.8.1.3.41]**

**2.8.1.3.42 composite\_cancel\_overlay CSU**

This CSU mission command is accomplished through a call to commander\_cancel\_overlay.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
commander_cancel_overlay	Sec. 2.8.1.1.8	

**Table 2.8-70: composite\_cancel\_overlay CSU [8.8.1.3.42]**

**2.8.1.3.43 composite\_halt CSU**

This CSU calls commander\_halt.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
type	int	Standard
Calls		
Function	Where Described	
commander_halt	Sec. 2.8.1.1.11	

**Table 2.8-71: composite\_halt CSU [8.8.1.3.43]**

**2.8.1.3.44 composite\_change\_speed CSU**

This CSU calls commander\_change\_speed.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
speed	REAL	sim_types.h
Calls		
Function	Where Described	
commander_change_speed	Sec. 2.8.1.1.14	

**Table 2.8-72: composite\_change\_speed CSU [8.8.1.3.44]**

**2.8.1.3.45 composite\_follow\_vehicle CSU**

This CSU calls commander\_follow\_vehicle.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
vid	unsigned int	Standard
xoff	int	Standard
yoff	int	Standard
Calls		
Function	Where Described	
commander_follow_vehicle	Sec. 2.8.1.1.17	

**Table 2.8-73: composite\_follow\_vehicle CSU [8.8.1.3.45]**

**2.8.1.3.46 composite\_simulator\_in\_command CSU**

This CSU calls commander\_simulator\_in\_command.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
vid	unsigned int	Standard
Calls		
Function	Where Described	
commander_simulator_in_command	Sec. 2.8.1.1.18	

**Table 2.8-74: composite\_simulator\_in\_command CSU [8.8.1.3.46]**

**2.8.1.3.47 composite\_change\_formation CSU**

This CSU calls commander\_change\_formation.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
formation	pointer to char	Standard
Calls		
Function	Where Described	
commander_change_formation	Sec. 2.8.1.1.16	

**Table 2.8-75: composite\_change\_formation CSU [8.8.1.3.47]**

**2.8.1.3.48 composite\_goto\_point CSU**

This CSU calls commander\_goto\_point.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
x	REAL	sim_types.h
y	REAL	sim_types.h
backwardp	int	Standard
Calls		
Function	Where Described	
commander_goto_point	Sec. 2.8.1.1.19	

**Table 2.8-76: composite\_goto\_point CSU [8.8.1.3.48]**

**2.8.1.3.49 composite\_resume\_mission CSU**

This CSU calls commander\_resume\_mission.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
commander_resume_mission	Sec. 2.8.1.1.20	

**Table 2.8-77: composite\_resume\_mission CSU [8.8.1.3.49]**

**2.8.1.3.50 composite\_face\_direction CSU**

This CSU calls `commander_face_direction`.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
mathradians	REAL	sim types.h
Calls		
Function	Where Described	
commander face direction	Sec. 2.8.1.1.21	

**Table 2.8-78: composite\_face\_direction CSU [8.8.1.3.50]**

**2.8.1.3.51 composite\_attack CSU**

This CSU calls `commander_attack`.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
st x	REAL	sim types.h
st y	REAL	sim types.h
tar x	REAL	sim types.h
tar y	REAL	sim types.h
Calls		
Function	Where Described	
commander attack	Sec. 2.8.1.1.27	

**Table 2.8-79: composite\_attack CSU [8.8.1.3.51]**

**2.8.1.3.52 composite\_land CSU**

This CSU calls `commander_land`.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
x	REAL	sim types.h
y	REAL	sim types.h
Calls		
Function	Where Described	
commander land	Sec. 2.8.1.1.25	

**Table 2.8-80: composite\_land CSU [8.8.1.3.52]**

**2.8.1.3.53 composite\_change\_altitude CSU**

This CSU calls `commander_change_altitude`.

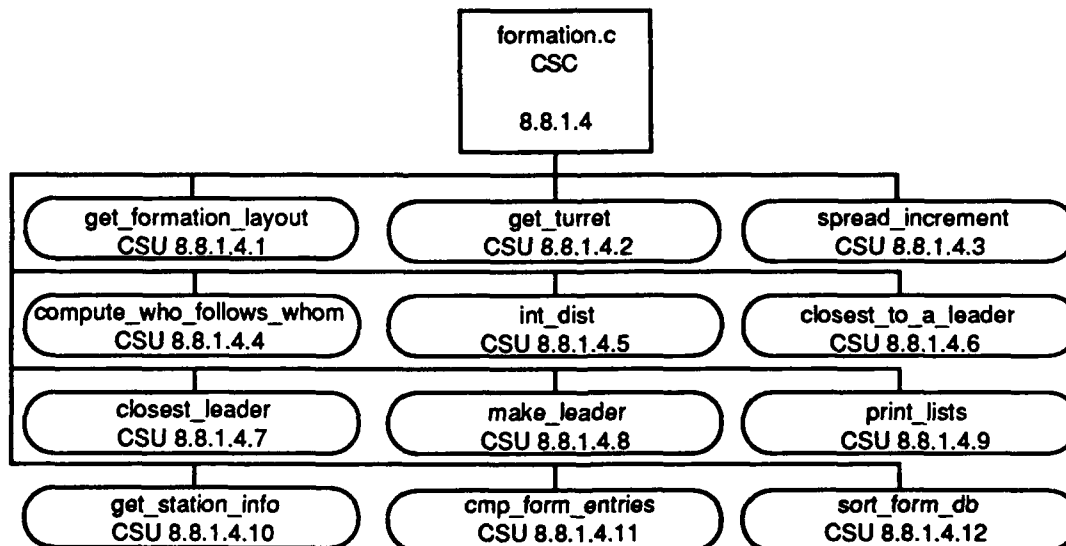
Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
alt	REAL	sim types.h
Calls		
Function	Where Described	
commander_change_altitude	Sec. 2.8.1.1.26	

**Table 2.8-81: composite\_change\_altitude CSU [8.8.1.3.53]**

**2.8.1.4 formation.c CSC**

/simnet/src/host/formation.c

This CSC takes the raw data in the formations parameter files and places vehicles into the proper positions. It decides who will follow whom in formation keeping, spacing, etc. Please note that whom a vehicle follows is not usually the vehicle from whom it takes orders.



**Figure 2.8-5: formation.c CSC Structure**

In addition to the 12 CSUs detailed below, and shown in the above figure, the formation.c CSC contains a number of constant definitions and a type definition structure, to be found in the following tables.

Constant	Value
FORM_JOB	1
FORM_X	2
FORM_Y	3
SMALL_NUMBER	-0x40000000
BIG_NUMBER	0x40000000
TURRET_UNKNOWN	0
TURRET_FRONT	1
TURRET_LEFT	2
TURRET_RIGHT	3
SEARCHING /* used by make_leader */	0
SHIFTING /* used by make_leader */	1

Table 2.8-82: formation.c Constant Definitions

The following formation description typedef struct is tagged formation\_desc.

Item	Type	Where Type Defined
x_pos	int	Standard
y_pos	int	Standard
xoff	int	Standard
yoff	int	Standard
leader /* index in job_list */	unsigned short	Standard
turret	unsigned short	Standard

Table 2.8-83: FORMATION\_DESC Structure Definition

#### 2.8.1.4.1 get\_formation\_layout CSU

This CSU derives a position for each vehicle, compensating for missing vehicles and extra vehicles. It then assigns turret orientations through recursive calls to get\_turret.

Parameters		
Parameters	Type	Where Typedef Declared
table	pointer to DATA_UNION	Sec. 2.1.1.5
formation	pointer to char	Standard
num_veh	unsigned short	Standard
job_list[ ]	pointer to char	Standard
fd_list[ ]	FORMATION_DESC	Sec. 2.8.1.4

Calls	
Function	Where Described
ft table	Sec. 2.14.1.2.14
symbols_match	Sec. 2.1.1.5 See Appendix A
spread increment	Sec. 2.8.1.4.3
compute who follows whom	Sec. 2.8.1.4.4
get turret	Sec. 2.8.1.4.2

Table 2.8-84: get\_formation\_layout CSU [8.8.1.4.1]

## 2.8.1.4.2 get\_turret CSU

This CSU checks a vehicle for a turret direction. If the vehicle does not have one, an appropriate direction is assigned based on its leader's turret direction.

Parameters		
Parameters	Type	Where Typedef Declared
for whom	unsigned short	Standard
fd_list[ ]	FORMATION_DESC	Sec. 2.8.1.4
Return Values		
Return Value	Type	Meaning
fd_list[for_whom].turret	unsigned short	He already has turret direction.
fd_list[for_whom].turret = TURRET_FRONT	unsigned short	None of the others.
fd_list[for_whom].turret = TURRET_LEFT	unsigned short	Leader is facing right.
fd_list[for_whom].turret = TURRET_RIGHT	unsigned short	Leader is facing left.
Calls		
Function	Where Described	
abs	Sec. 2.6.7.3 & Sec. 2.13.3.2 See Appendix A	
get turret	Sec. 2.8.1.4.2	

Table 2.8-85: get\_turret CSU [8.8.1.4.2]

## 2.8.1.4.3 spread\_increment CSU

This CSU determines an appropriate vehicle spacing when units are missing.

Parameters		
Parameters	Type	Where Typedef Declared
av	unsigned short	Standard
front	int	Standard
bv	unsigned short	Standard

ReturnValues		
Return Value	Type	Meaning
front	int	Base no. of vehicles is 1 and actual no. of vehicles is 0.
(front / (bv - 1)) / av	int	Base no. of vehicles minus actual no. of vehicles equals 1.
previous_spread + this_spread	int	None of the above.
Calls		
Function	Where Described	
spread_increment	Sec. 2.8.1.4.3	

Table 2.8-86: spread\_increment CSU [8.8.1.4.3]

## 2.8.1.4.4 compute\_who\_follows\_whom CSU

This CSU determines which vehicle each vehicle should follow.

Parameters		
Parameters	Type	Where Typedef Declared
num veh	unsigned short	Standard
fd_list[ ]	FORMATION_DESC	Sec. 2.8.1.4
y_max	int	Standard
xmid	int	Standard
Calls		
Function	Where Described	
abs	Sec. 2.6.7.3 & Sec. 2.13.3.2 See Appendix A	
make_leader	Sec. 2.8.1.4.8	
print_lists	Sec. 2.8.1.4.9	
closest to a leader	Sec. 2.8.1.4.6	
DEBUG COMPOSITE	Sec. 2.5.2.2 See Appendix A	
closest_leader	Sec. 2.8.1.4.7	

Table 2.8-87: compute\_who\_follows\_whom CSU [8.8.1.4.4]

## 2.8.1.4.5 int\_dist CSU

This CSU returns the sum of the squares of the input parameters, x and y.

Parameters		
Parameters	Type	Where Typedef Declared
x	int	Standard
y	int	Standard
ReturnValues		
Return Value	Type	Meaning
x*x + y*y	int	Sum of squares x and y.

Table 2.8-88: int\_dist CSU [8.8.1.4.5]



**2.8.1.4.6 closest\_to\_a\_leader CSU**

This CSU returns the index of the vehicle closest to a specified vehicle already on the leader list.

Parameters		
Parameters	Type	Where Typedef Declared
leader_list[ ]	unsigned short	Standard
follower_list[ ]	unsigned short	Standard
num_leaders	unsigned short	Standard
num_followers	unsigned short	Standard
x_list[ ]	int	Standard
y_list[ ]	int	Standard
ReturnValues		
Return Value	Type	Meaning
closest_so_far	unsigned short	Closest unit to leader.
Calls		
Function	Where Described	
int dist	Sec. 2.8.1.4.5	

Table 2.8-89: closest\_to\_a\_leader CSU [8.8.1.4.6]

**2.8.1.4.7 closest\_leader CSU**

This CSU returns the index of the vehicle on the leader list closest to the specified vehicle.

Parameters		
Parameters	Type	Where Typedef Declared
to_whom	unsigned short	Standard
leader_list[ ]	unsigned short	Standard
num_leaders	unsigned short	Standard
x_list[ ]	int	Standard
y_list[ ]	int	Standard
ReturnValues		
Return Value	Type	Meaning
closest_so_far	unsigned short	Closest follower
Calls		
Function	Where Described	
int dist	Sec. 2.8.1.4.5	

Table 2.8-90: closest\_leader CSU [8.8.1.4.7]

**2.8.1.4.8 make\_leader CSU**

This CSU removes a vehicle from the follower list and adds it to the leader list.

Parameters		
Parameters	Type	Where Typedef Declared
who	unsigned short	Standard
leader list[ ]	unsigned short	Standard
follower list[ ]	unsigned short	Standard
num leaders	pointer to unsigned short	Standard
num followers	pointer to unsigned short	Standard

**Table 2.8-91: make\_leader CSU [8.8.1.4.8]**

**2.8.1.4.9 print\_lists CSU**

This CSU displays a list of leaders and followers.

Parameters		
Parameters	Type	Where Typedef Declared
lead[ ]	unsigned short	Standard
folll[ ]	unsigned short	Standard
nlead	unsigned short	Standard
nfolll	unsigned short	Standard

**Table 2.8-92: print\_lists CSU [8.8.1.4.9]**

**2.8.1.4.10 get\_station\_info CSU**

This CSU collects vehicle information, finds positions for these vehicles, and returns the positions.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
table	pointer to DATA UNION	Sec. 2.1.1.5
formation	pointer to char	Standard
num veh	unsigned short	Standard
veh_list[ ]	pointer to SAF OBJECT	Sec. 2.9.1.1
id_list[ ]	unsigned int	Standard
xoff_list[ ]	int	Standard
yoff_list[ ]	int	Standard
x_pos_list[ ]	int	Standard
y_pos_list[ ]	int	Standard
turret left list[ ]	REAL	sim types.h
turret right list[ ]	REAL	sim types.h
ReturnValues		
Return Value	Type	Meaning
unit_leader	pointer to SAF OBJECT	The unit lead vehicle.

Calls	
Function	Where Described
saf_vehicle_useless	Sec. 2.6.1.1.41
get_formation_layout	Sec. 2.8.1.4.1
deg to rad	sim macros.h
OBJ_VEHICLEID	Sec. 2.9.1.1 See Appendix A

Table 2.8-93: get\_station\_info CSU [8.8.1.4.10]

## 2.8.1.4.11 cmp\_form\_entries CSU

This CSU, given two entries in the formation database, determines which is more front and center.

Parameters		
Parameters	Type	Where Typedef Declared
fe0	pointer to pointer to DATA UNION	Sec. 2.1.1.5
fe1	pointer to pointer to DATA UNION	Sec. 2.1.1.5
ReturnValues		
Return Value	Type	Meaning
(by-ay)	int	Furthest forward comes first.
(ax-bx)	int	Furthest to the left comes first.

Table 2.8-94: cmp\_form\_entries CSU [8.8.1.4.11]

## 2.8.1.4.12 sort\_form\_db CSU

This CSU sorts the formation database such that the most front-and-center vehicle appears first in each group.

Parameters		
Parameters	Type	Where Typedef Declared
table	pointer to DATA UNION	Sec. 2.1.1.5
Calls		
Function	Where Described	
qsort	Sec. 2.	

Table 2.8-95: sort\_form\_db CSU [8.8.1.4.12]

## 2.8.2 Reports CSC

### 2.8.2.1 reporter.c CSC

/simnet/src/host/reporter.c

This code handles the clustering of groups of vehicles and sets of artillery impacts, reporting them to the user.

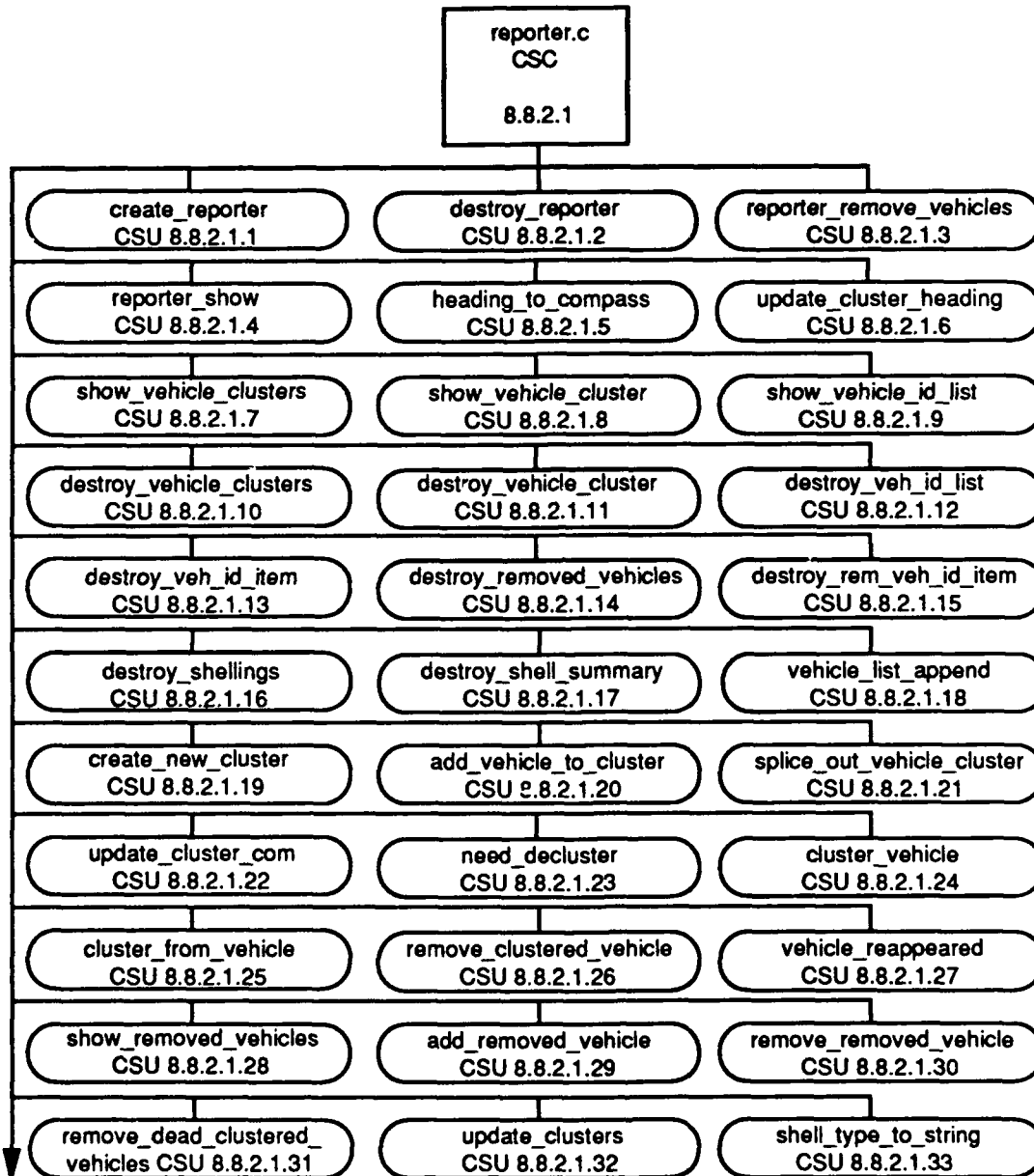


Figure 2.8-6: reporter.c CSC Structure Part 1 of 2

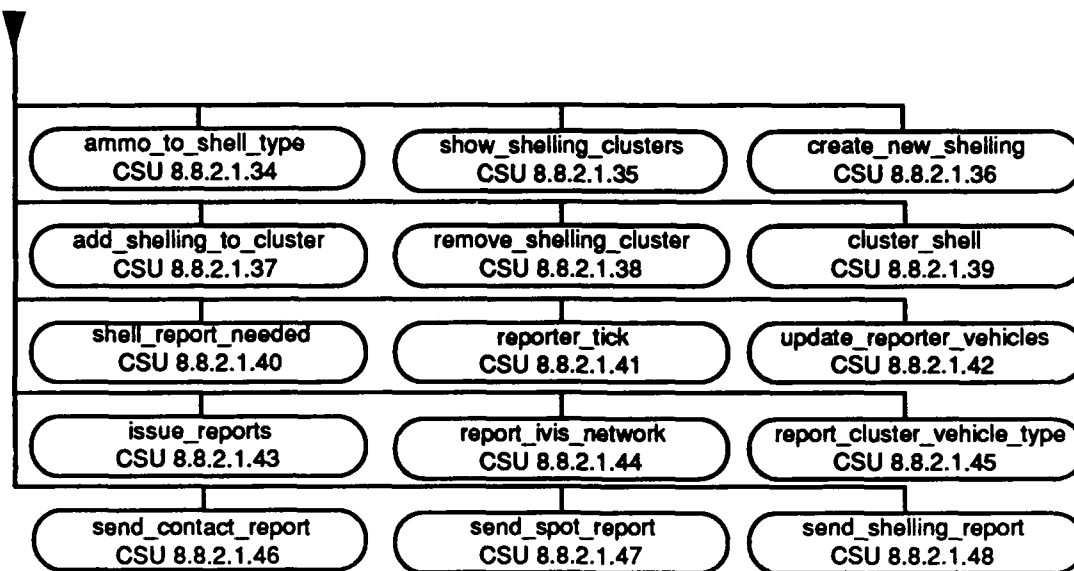


Figure 2.8-7: reporter.c CSC Structure Part 2 of 2

#### 2.8.2.1.1 create\_reporter CSU

This CSU allocates memory for a reporter's REPORTER\_VARS structure and its current and old vehicle bitfield. It initializes the reporter's structure, and returns a pointer to that structure.

ReturnValues		
Return Value	Type	Meaning
reporter	pointer to REPORTER_VARS	Created reporter.
Calls		
Function	Where Described	
allocate reporter	Sec. 2.9.1.2 See Appendix A	
allocate bitfield	Sec. 2.14.3.4.1	
clear bitfield	Sec. 2.14.3.4.6	

Table 2.8-96: create\_reporter CSU [8.8.2.1.1]

#### 2.8.2.1.2 destroy\_reporter CSU

This CSU destroys the records of the reporter and deallocates its structure memory heap.

Parameters		
Parameters	Type	Where Typedef Declared
reporter	pointer to REPORTER_VARS	Sec. 2.9.1.2 veh_storage.h

Calls	
Function	Where Described
destroy_vehicle_clusters	Sec. 2.8.2.1.10
destroy_removed_vehicles	Sec. 2.8.2.1.14
destroy_shellings	Sec. 2.8.2.1.16
deallocate_bitfield	Sec. 2.14.3.4.2
deallocate_reporter	Sec. 2.9.1.2 See Appendix A

Table 2.8-97: destroy\_reporter CSU [8.8.2.1.2]

## 2.8.2.1.3 reporter\_remove\_vehicles CSU

This CSU removes the clustered vehicles passed as parameters and clears the reporter's current and old vehicle tables for these vehicles.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
num	int	Standard
v_list[ ]	unsigned int	Standard

Calls	
Function	Where Described
remove_clustered_vehicle	Sec. 2.8.2.1.26
clear_bit	Sec. 2.14.3.4.4

Table 2.8-98: reporter\_remove\_vehicles CSU [8.8.2.1.3]

## 2.8.2.1.4 reporter\_show CSU

This CSU displays the reporter's current information concerning vehicles and shellings.

Parameters		
Parameters	Type	Where Typedef Declared
reporter	pointer to REPORTER_VARS	Sec. 2.9.1.2 veh_storage.h
flags	int	Standard

Calls	
Function	Where Described
show_vehicle_clusters	Sec. 2.8.2.1.6
show_removed_vehicles	Sec. 2.8.2.1.28
show_shelling_clusters	Sec. 2.8.2.1.35

Table 2.8-99: reporter\_show CSU [8.8.2.1.4]

**2.8.2.1.5 heading\_to\_compass CSU**

This CSU converts the angle passed into a compass-point-heading character string containing the direction if the angle passed is not for a stationary heading or if it is too large.

Parameters		
Parameters	Type	Where Typedef Declared
angle	REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
"stationary or heading in and terminated"	pointer to char	angle == STATIONARY_HEADING
"heading West"	pointer to char	angle < $(-7.0 / 8.0) * \text{PI}$
"heading Southwest"	pointer to char	angle < $(-5.0 / 8.0) * \text{PI}$
"heading South"	pointer to char	angle < $(-3.0 / 8.0) * \text{PI}$
"heading Southeast"	pointer to char	angle < $(-1.0 / 8.0) * \text{PI}$
"heading East"	pointer to char	angle < $(1.0 / 8.0) * \text{PI}$
"heading Northeast"	pointer to char	angle < $(3.0 / 8.0) * \text{PI}$
"heading North"	pointer to char	angle < $(5.0 / 8.0) * \text{PI}$
"heading Northwest"	pointer to char	angle < $(7.0 / 8.0) * \text{PI}$
"heading West"	pointer to char	angle <= $(8.0 / 8.0) * \text{PI}$
"Unknown Direction"	pointer to char	Direction is unknown.

Table 2.8-100: heading\_to\_compass CSU [8.8.2.1.5]

**2.8.2.1.6 update\_cluster\_heading CSU**

This CSU updates a cluster heading either to the new heading or to its stationary heading if insignificant change has occurred.

Parameters		
Parameters	Type	Where Typedef Declared
cluster	pointer to VEH_CLUSTER	Sec. 2.8.2.2
old_com	pointer to REAL	sim_types.h
Calls		
Function	Where Described	
vec_sub	Sec. 2.6.2.65.1 Vehicles CSCI SDD	
vec2_dot	Sec. 2.14.3.5.24	
s_atan2	Sec. 2.14.3.9 See Appendix A	

Table 2.8-101: update\_cluster\_heading CSU [8.8.2.1.6]

**2.8.2.1.7 show\_vehicle\_clusters CSU**

This CSU calls show\_vehicle\_cluster for each of the clusters.

Parameters		
Parameters	Type	Where Typedef Declared
cluster	pointer to VEH_CLUSTER	Sec. 2.8.2.2
Calls		
Function	Where Described	
show_vehicle_cluster	Sec. 2.8.2.1.8	

**Table 2.8-102: show\_vehicle\_clusters CSU [8.8.2.1.7]**

**2.8.2.1.8 show\_vehicle\_cluster CSU**

This CSU displays a status report on the cluster passed including a list of the vehicle identifications within the cluster.

Parameters		
Parameters	Type	Where Typedef Declared
cluster	pointer to VEH_CLUSTER	Sec. 2.8.2.2
Calls		
Function	Where Described	
heading to compass	Sec. 2.8.2.1.5	
show_vehicle_id_list	Sec. 2.8.2.1.9	

**Table 2.8-103: show\_vehicle\_cluster CSU [8.8.2.1.8]**

**2.8.2.1.9 show\_vehicle\_id\_list CSU**

This CSU displays the vehicle identification list for the cluster.

Parameters		
vehicles	pointer to VEH_ID_LIST	Sec. 2.8.2.2

**Table 2.8-104: show\_vehicle\_id\_list CSU [8.8.2.1.9]**

**2.8.2.1.10 destroy\_vehicle\_clusters CSU**

This CSU, through multiple calls to destroy\_vehicle\_cluster, destroys all the clusters passed.

Parameters		
Parameters	Type	Where Typedef Declared
clusters	pointer to VEH_CLUSTER	Sec. 2.8.2.2



Calls	
Function	Where Described
destroy_vehicle_cluster	Sec. 2.8.2.1.11

Table 2.8-105: destroy\_vehicle\_clusters CSU [8.8.2.1.10]

## 2.8.2.1.11 destroy\_vehicle\_cluster CSU

This CSU destroys a vehicle cluster by destroying the vehicle identification list, setting the cluster->vehicles element in the passed VEH\_CLUSTER structure to NULL, and deallocating the memory heap for the cluster structure.

Parameters		
Parameters	Type	Where Typedef Declared
cluster	pointer to VEH_CLUSTER	Sec. 2.8.2.2
Calls		
Function	Where Described	
destroy veh id list	Sec. 2.8.2.1.12	
deallocate veh cluster	Sec. 2.8.2.2 See Appendix A	

Table 2.8-106: destroy\_vehicle\_cluster CSU [8.8.2.1.11]

## 2.8.2.1.12 destroy\_veh\_id\_list CSU

This CSU destroys a vehicle identification list through calls to destroy\_vehicle\_id\_item for each vehicle in the VEH\_ID\_LIST.

Parameters		
Parameters	Type	Where Typedef Declared
vehicles	pointer to VEH_ID_LIST	Sec. 2.8.2.2
Calls		
Function	Where Described	
destroy_veh_id_item	Sec. 2.8.1.2.13	

Table 2.8-107: destroy\_veh\_id\_list CSU [8.8.2.1.12]

## 2.8.2.1.13 destroy\_veh\_id\_item CSU

This CSU destroys a vehicle identification item through a call to deallocate\_veh\_id\_list.

Parameters		
Parameters	Type	Where Typedef Declared
vehicle	pointer to VEH_ID_LIST	Sec. 2.8.2.2

Calls	
Function	Where Described
deallocate veh id list	Sec. 2.8.2.2 See Appendix A

Table 2.8-108: destroy Veh ID item CSU [8.8.2.1.13]

## 2.8.2.1.14 destroy\_removed\_vehicles CSU

This CSU destroys a removed vehicle identification list through calls to destroy\_rem\_veh\_id\_item for each vehicle in the REM\_VEH\_ID\_LIST.

Parameters		
Parameters	Type	Where Typedef Declared
vehicle	pointer to REM_VEH_ID_LIST	Sec. 2.8.2.2
Calls		
Function	Where Described	
destroy_rem_veh_id_item	Sec. 2.8.2.1.15	

Table 2.8-109: destroy\_removed\_vehicles CSU [8.8.2.1.14]

## 2.8.2.1.15 destroy\_rem\_veh\_id\_item CSU

This CSU destroys a removed vehicle identification item through a call to deallocate\_rem\_veh\_id\_list.

Parameters		
Parameters	Type	Where Typedef Declared
vehicle	pointer to REM_VEH_ID_LIST	Sec. 2.8.2.2
Calls		
Function	Where Described	
deallocate_rem_veh_id_list	Sec. 2.8.2.2 See Appendix A	

Table 2.8-110: destroy\_rem\_veh\_id\_item CSU [8.8.2.1.15]

## 2.8.2.1.16 destroy\_shellings CSU

This CSU destroys each shell summary in the SHELL\_SUMMARY structure, through calls to destroy\_shell\_summary.

Parameters		
Parameters	Type	Where Typedef Declared
shell	pointer to SHELL_SUMMARY	Sec. 2.8.2.2
Calls		
Function	Where Described	
destroy_shell_summary	Sec. 2.8.2.1.17	

Table 2.8-111: destroy\_shellings CSU [8.8.2.1.16]

**2.8.2.1.17 destroy\_shell\_summary CSU**

This CSU destroys a shell summary structure through a call to deallocate\_shell\_summary.

Parameters		
Parameters	Type	Where Typedef Declared
shell	pointer to SHELL_SUMMARY	Sec. 2.8.2.2
Calls		
Function	Where Described	
deallocate_shell_summary	Sec. 2.8.2.2 See Appendix A	

**Table 2.8-112: destroy\_shell\_summary CSU [8.8.2.1.17]**

**2.8.2.1.18 vehicle\_list\_append CSU**

This CSU appends two vehicle lists and returns the results.

Parameters		
Parameters	Type	Where Typedef Declared
l1	pointer to VEH_ID_LIST	Sec. 2.8.2.2
l2	pointer to VEH_ID_LIST	Sec. 2.8.2.2
ReturnValues		
Return Value	Type	Meaning
l1	pointer to VEH_ID_LIST	Only l1 exists or l2 appended.
l2	pointer to VEH_ID_LIST	Only l2 exists.

**Table 2.8-113: vehicle\_list\_append CSU [8.8.2.1.18]**

**2.8.2.1.19 create\_new\_cluster CSU**

This CSU creates a new vehicle cluster containing one vehicle, the vehicle passed as an argument to the function.

Parameters		
Parameters	Type	Where Typedef Declared
veh_id	unsigned int	Standard
monitor_time	unsigned int	Standard
report_status		
ReturnValues		
Return Value	Type	Meaning
cluster	pointer to register VEH_CLUSTER	Created cluster.

Calls	
Function	Where Described
LOOKUP POSITION	Sec. 2.9.1.1 See Appendix A
LOOKUP VELOCITY	Sec. 2.9.1.1 See Appendix A
allocate veh cluster	Sec. 2.8.2.2 See Appendix A
vec copy	Sec. 2.6.2.59.1 Vehicles CSCI SDD
vec2 dot	Sec. 2.14.3.5.24
s atan2	Sec. 2.14.3.9 See Appendix A
allocate veh id list	Sec. 2.8.2.2 See Appendix A

Table 2.8-114: create\_new\_cluster CSU [8.8.2.1.19]

## 2.8.2.1.20 add\_vehicle\_to\_cluster CSU

This CSU adds a vehicle to an existing cluster. The center of mass of the cluster is then updated through a call to update\_cluster\_com.

Parameters		
Parameters	Type	Where Typedef Declared
veh_id	unsigned int	Standard
cluster	pointer to VEH_CLUSTER	Sec. 2.8.2.2
report_status		
Errors		
Error Name	Reason for Error	
"Attempt to add vehicle ... to empty cluster."	There are no vehicles in the cluster.	
Calls		
Function	Where Described	
allocate veh_id list	Sec. 2.8.2.2 See Appendix A	
update cluster com	Sec. 2.8.2.1.22	

Table 2.8-115: add\_vehicle\_to\_cluster CSU [8.8.2.1.20]

## 2.8.2.1.21 splice\_out\_vehicle\_cluster CSU

This CSU removes a vehicle cluster but does not deallocate the list of vehicles within it.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
cluster	pointer to VEH_CLUSTER	Sec. 2.8.2.2
Calls		
Function	Where Described	
deallocate veh cluster	Sec. 2.8.2.2 See Appendix A	

Table 2.8-116: splice\_out\_vehicle\_cluster CSU [8.8.2.1.21]

**2.8.2.1.22 update\_cluster\_com CSU**

This CSU recomputes the center of mass of a cluster.

Parameters		
Parameters	Type	Where Typedef Declared
cluster	pointer to VEH_CLUSTER	Sec. 2.8.2.2
Calls		
Function	Where Described	
vec_init	Sec. 2.6.2.61.1 Vehicles CSCI SDD	
vec_add	Sec. 2.6.2.57.1 Vehicles CSCI SDD	
LOOKUP_POSITION	Sec. 2.9.1.1 See Appendix A	
vec_scale	Sec. 2.6.2.64.1 Vehicles CSCI SDD	

**Table 2.8-117: update\_cluster\_com CSU [8.8.2.1.22]**

**2.8.2.1.23 need\_decluster CSU**

This CSU checks if a cluster needs to be broken up because its vehicles have moved too far from the cluster's center of mass.

Parameters		
Parameters	Type	Where Typedef Declared
cluster	pointer to VEH_CLUSTER	Sec. 2.8.2.2
thresh2	REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
TRUE	int	A vehicle is too far away.
FALSE	int	No vehicles are too far away.
Calls		
Function	Where Described	
vec2_range_squared	Sec. 2.14.3.5.30	
LOOKUP_POSITION	Sec. 2.9.1.1 See Appendix A	

**Table 2.8-118: need\_decluster CSU [8.8.2.1.23]**

**2.8.2.1.24 cluster\_vehicle CSU**

This CSU adds a vehicle to the vehicle's cluster system. An existing cluster may be augmented, or a new cluster may be added.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
veh_id	unsigned int	Standard
report_status	int	Standard

Calls	
Function	Where Described
DEBUG REPORTER	Sec. 2.5.2.2 See Appendix A
OBJ VEHICLEID	Sec. 2.9.1.1 See Appendix A
create new cluster	Sec. 2.8.2.1.19
vec2 range squared	Sec. 2.14.3.5.30
add vehicle to cluster	Sec. 2.8.2.1.20

Table 2.8-119: cluster\_vehicle CSU [8.8.2.1.24]

## 2.8.2.1.25 cluster\_from\_vehicle CSU

This CSU finds the cluster in which a vehicle exists. If the vehicle is not in any cluster, NULL is returned.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
veh_id	unsigned int	Standard
ReturnValues		
Return Value	Type	Meaning
NULL	pointer to VEH CLUSTER	Vehicle not in cluster.
cluster	pointer to VEH CLUSTER	Cluster containing vehicle.

Table 2.8-120: cluster\_from\_vehicle CSU [8.8.2.1.25]

## 2.8.2.1.26 remove\_clustered\_vehicle CSU

This CSU removes a vehicle from its cluster system. Depending on the passed argument, the removed vehicle may be recorded in the removed\_vehicle\_list.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
veh_id	unsigned int	Standard
save_him	int	Standard
Calls		
Function	Where Described	
DEBUG REPORTER	Sec. 2.5.2.2 See Appendix A	
OBJ VEHICLEID	Sec. 2.9.1.1 See Appendix A	
add removed vehicle	Sec. 2.8.2.1.29	
destroy veh_id item	Sec. 2.8.2.1.13	
splice out vehicle cluster	Sec. 2.8.2.1.21	

Table 2.8-121: remove\_clustered\_vehicle CSU [8.8.2.1.26]

**2.8.2.1.27 vehicle\_reappeared CSU**

This CSU searches through a removed\_vehicle\_list for the specified input vehicle, and removes it from the list if it is there.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
id	unsigned int	Standard
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Vehicle removed from list.
FALSE	int	Vehicle not found in list.
Calls		
Function	Where Described	
remove removed vehicle	Sec. 2.8.2.1.30	
DEBUG REPORTER	Sec. 2.5.2.2 See Appendix A	
OBJ_VEHICLEID	Sec. 2.9.1.1 See Appendix A	

**Table 2.8-122: vehicle\_reappeared CSU [8.8.2.1.27]**

**2.8.2.1.28 show\_removed\_vehicles CSU**

This CSU displays all the recorded removed vehicles in the input removed\_vehicle\_list.

Parameters		
Parameters	Type	Where Typedef Declared
vehicles	pointer to REM_VEH_ID_LIST	Sec. 2.8.2.2

**Table 2.8-123: show\_removed\_vehicles CSU [8.8.2.1.28]**

**2.8.2.1.29 add\_removed\_vehicle CSU**

This CSU adds a vehicle to the removed\_vehicle\_list.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
id	unsigned int	Standard
Calls		
Function	Where Described	
allocate rem veh id list	Sec. 2.8.2.2 See Appendix A	

**Table 2.8-124: add\_removed\_vehicle CSU [8.8.2.1.29]**

**2.8.2.1.30 remove\_removed\_vehicle CSU**

This CSU removes a vehicle from the removed\_vehicle\_list.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
removed	pointer to REM_VEH_ID_LIST	Sec. 2.8.2.2
Calls		
Function	Where Described	
destroy_rem_veh_id_item	Sec. 2.8.2.1.15	

**Table 2.8-125: remove\_removed\_vehicle CSU [8.8.2.1.30]**

**2.8.2.1.31 remove\_dead\_clustered\_vehicles CSU**

This CSU removes all dead vehicles from the vehicle cluster system. If a cluster has all of its vehicles removed, that cluster is deallocated.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
is_dead	Sec. 2.13.3.1 See Appendix A	
LOOKUP_APPEARANCE	Sec. 2.9.1.1 See Appendix A	
LOOKUP_VEHICLECLASS	Sec. 2.9.1.1 See Appendix A	
DEBUG_REPORTER	Sec. 2.5.2.2 See Appendix A	
OBJ_VEHICLEID	Sec. 2.9.1.1 See Appendix A	
destroy_veh_id_item	Sec. 2.8.2.1.13	
deallocate_veh_cluster	Sec. 2.8.2.2 See Appendix A	

**Table 2.8-126: remove\_dead\_clustered\_vehicles CSU [8.8.2.1.31]**

**2.8.2.1.32 update\_clusters CSU**

This CSU removes the dead clustered vehicles, recalculates all cluster centers of mass and headings, declusters all clusters that are too spread out or too close to each other, and reclusters all of the declustered vehicles.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1



Calls	
Function	Where Described
remove_dead_clustered_vehicles	Sec. 2.8.2.1.31
vec_copy	Sec. 2.6.2.59.1 Vehicles CSCI SDD
update_cluster_com	Sec. 2.8.2.1.22
update_cluster_heading	Sec. 2.8.2.1.6
need_decluster	Sec. 2.8.2.1.23
DEBUG REPORTER	Sec. 2.5.2.2 See Appendix A
OBJ VEHICLEID	Sec. 2.9.1.1 See Appendix A
vehicle_list_append	Sec. 2.8.2.1.18
splice_out_vehicle_cluster	Sec. 2.8.2.1.21
vec2_range_squared	Sec. 2.14.3.5.30
cluster_vehicle	Sec. 2.8.2.1.24
destroy_veh_id_list	Sec. 2.8.2.1.12

Table 2.8-127: update\_clusters CSU [8.8.2.1.32]

## 2.8.2.1.33 shell\_type\_to\_string CSU

This CSU returns a human-readable string indicating what shell type was passed as the argument.

Parameters		
Parameters	Type	Where Typedef Declared
type	int	Standard
ReturnValues		
Return Value	Type	Meaning
"Mortar"	pointer to char	Type is SHELL_TYPE MORTAR.
"Artillery"	pointer to char	Type is SHELL_TYPE ARTILLERY.
"Mine"	pointer to char	Type is SHELL_TYPE MINE.
"unknown indirect fire"	pointer to char	Type is none of the above.

Table 2.8-128: shell\_type\_to\_string CSU [8.8.2.1.33]

## 2.8.2.1.34 ammo\_to\_shell\_type CSU

This CSU extracts the shell type from the ammo object type.

Parameters		
Parameters	Type	Where Typedef Declared
ammo	ObjectType	p_sim.h

ReturnValues		
Return Value	Type	Meaning
SHELL TYPE MINE	int	Ammo is mine.
SHELL TYPE ARTILLERY	int	Ammo is artillery.
SHELL TYPE MORTAR	int	Ammo is mortar.

Table 2.8-129: ammo\_to\_shell\_type CSU [8.8.2.1.34]

## 2.8.2.1.35 show\_shelling\_clusters CSU

This CSU displays information about each shelling cluster (e.g., center of mass, shell type, and number of shells).

Parameters		
Parameters	Type	Where Typedef Declared
shell	pointer to SHELL_SUMMARY	Sec. 2.8.2.2
Calls		
Function	Where Described	
shell type to string	Sec. 2.8.2.1.33	

Table 2.8-130: show\_shelling\_clusters CSU [8.8.2.1.35]

## 2.8.2.1.36 create\_new\_shelling CSU

This CSU creates a new shelling cluster.

Parameters		
Parameters	Type	Where Typedef Declared
pos	pointer to REAL	sim_types.h
type	int	Standard
ReturnValues		
Return Value	Type	Meaning
shell	pointer to SHELL_SUMMARY	Created shelling cluster.
Calls		
Function	Where Described	
allocate shell summary	Sec. 2.8.2.2 See Appendix A	
vec_copy	Sec. 2.6.2.59.1 Vehicles CSCI SDD	

Table 2.8-131: create\_new\_shelling CSU [8.8.2.1.36]

**2.8.2.1.37 add\_shelling\_to\_cluster CSU**

This CSU adds a shelling to an existing shelling cluster, then updates the cluster's center of mass.

Parameters		
Parameters	Type	Where Typedef Declared
pos	pointer to REAL	sim_types.h
shell	pointer to SHELL SUMMARY	Sec. 2.8.2.2
Calls		
Function	Where Described	
vec_scale	Sec. 2.6.2.64.1 Vehicles CSCI SDD	
vec_add	Sec. 2.6.2.57.1 Vehicles CSCI SDD	

Table 2.8-132: add\_shelling\_to\_cluster CSU [8.8.2.1.37]

**2.8.2.1.38 remove\_shelling\_cluster CSU**

This CSU removes a shelling cluster from a vehicle's shelling cluster system.

Parameters		
Parameters	Type	Where Typedef Declared
reporter	pointer to REPORTER VARS	Sec. 2.9.1.2 veh_storage.h
shell	pointer to SHELL SUMMARY	Sec. 2.8.2.2
Calls		
Function	Where Described	
deallocate_shell_summary	Sec. 2.8.2.2 See Appendix A	

Table 2.8-133: remove\_shelling\_cluster CSU [8.8.2.1.38]

**2.8.2.1.39 cluster\_shell CSU**

This CSU adds a shelling to a vehicle's shelling cluster system if the shelling is close enough to be significant.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
pos	pointer to REAL	sim_types.h
ammo	ObjectType	p_sim.h

Calls	
Function	Where Described
ammo to shell type	Sec. 2.8.2.1.34
vec2 range squared	Sec. 2.14.3.5.30
OBJ POSITION	Sec. 2.5.2.2 See Appendix A
DEBUG REPORTER	Sec. 2.9.1.1 See Appendix A
OBJ VEHICLEID	Sec. 2.9.1.1 See Appendix A
create new shelling	Sec. 2.8.2.1.36
add shelling to cluster	Sec. 2.8.2.1.37

Table 2.8-134: cluster\_shell CSU [8.8.2.1.39]

## 2.8.2.1.40 shell\_report\_needed CSU

This CSU checks if a shelling report is needed based on the presence of new shelling or the elapse of a specified duration of time since the last report.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
shell	pointer to SHELL_SUMMARY	Sec. 2.8.2.2
ReturnValues		
Return Value	Type	Meaning
(shell->time_of_rep == 0)	int	Normal end.
! (g_last_millisecond_time - shell->time_of_rep > g_report_monitor_time)		
! (g_last_millisecond_time - shell->time_of_last_shell > DEFAULT_SHELL_LATENCY)		

Table 2.8-135: shell\_report\_needed CSU [8.8.2.1.40]

## 2.8.2.1.41 reporter\_tick CSU

This CSU is the primary interface to the reporter. Clusters and vehicle information are updated periodically, and reports are issued.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1

Calls	
Function	Where Described
update_clusters	Sec. 2.8.2.1.32
get me a random fraction	Sec. 2.14.3.7.1
update_reporter_vehicles	Sec. 2.8.4.1.42
issue_reports	Sec. 2.8.4.1.43

Table 2.8-136: reporter\_tick CSU [8.8.2.1.41]

## 2.8.2.1.42 update\_reporter\_vehicles CSU

This CSU obtains new information about what vehicles are visible from the spotter. Changes in this information cause vehicles to be clustered or declustered.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
copy_bitfield	Sec. 2.14.3.4.5	
extract_bit	Sec. 2.14.3.9 See Appendix A	
is_dead	Sec. 2.13.3.1 See Appendix A	
LOOKUP_APPEARANCE	Sec. 2.9.1.1 See Appendix A	
LOOKUP_VEHICLECLASS	Sec. 2.9.1.1 See Appendix A	
vehicle_reappeared	Sec. 2.8.2.1.27	
cluster_vehicle	Sec. 2.8.2.1.24	
remove_clustered_vehicle	Sec. 2.8.2.1.26	

Table 2.8-137: update\_reporter\_vehicles CSU [8.8.2.1.42]

## 2.8.2.1.43 issue\_reports CSU

This CSU causes contact, spot and shelling reports to be issued.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
send_contact_report	Sec. 2.8.2.1.46	
vec2_range_squared	Sec. 2.14.3.5.30	
send_spot_report	Sec. 2.8.2.1.47	
shell_report_needed	Sec. 2.8.2.1.40	
send_shelling_report	Sec. 2.8.2.1.48	
DEBUG_REPORTER	Sec. 2.9.1.1 See Appendix A	
OBJ_VEHICLEID	Sec. 2.9.1.1 See Appendix A	
remove_shelling_cluster	Sec. 2.8.2.1.38	

Table 2.8-138: issue\_reports CSU [8.8.2.1.43]

## 2.8.2.1.44 report\_ivis\_network CSU

This CSU computes an IVIS network based on an input text string.

Parameters		
Parameters	Type	Where Typedef Declared
text	pointer to char	Standard
ReturnValues		
Return Value	Type	Meaning
a1P1tNetwork	int	Input text: A1 or 11
a2P1tNetwork	int	Input text: A2 or 12
a3P1tNetwork	int	Input text: A3 or 13
aCoNetwork	int	Input text: An or 1n (n != 1, 2, or 3)
b1P1tNetwork	int	Input text: B1 or 21
b2P1tNetwork	int	Input text: B2 or 22
b3P1tNetwork	int	Input text: B3 or 23
bCoNetwork	int	Input text: Bn or 2n (n != 1, 2, or 3)
c1P1tNetwork	int	Input text: C1 or 31
c2P1tNetwork	int	Input text: C2 or 32
c3P1tNetwork	int	Input text: C3 or 3
cCoNetwork	int	Input text: Cn or 3n (n != 1, 2, or 3)
d1P1tNetwork	int	Input text: D1 or 41
d2P1tNetwork	int	Input text: D2 or 42
d3P1tNetwork	int	Input text: D3 or 43
dCoNetwork	int	Input text: Dn or 4n (n != 1, 2, or 3)
bnCommandNetwork	int	Input text is none of the above.

Table 2.8-139: report\_ivis\_network CSU [8.8.2.1.44]

## 2.8.2.1.45 report\_cluster\_vehicle\_type CSU

This CSU returns the predominant vehicle type in a cluster.

Parameters		
Parameters	Type	Where Typedef Declared
cluster	pointer to VEH_CLUSTER	Sec. 2.8.2.2
ReturnValues		
Return Value	Type	Meaning
type	int	Normal end.
Calls		
Function	Where Described	
LOOKUP_OBJECT_TYPE	Sec. 2.9.1.1 See Appendix A	

Table 2.8-140: report\_cluster\_vehicle\_type CSU [8.8.2.1.45]

**2.8.2.1.46 send\_contact\_report CSU**

This CSU sends contact reports for a cluster, both throughout the IVIS network and to the Symbolics.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
cluster	pointer to VEH_CLUSTER	Sec. 2.8.2.2
Calls		
Function	Where Described	
buffer allocate	Sec. 2.14.4.2.12	
tdb_giv_xy_get_utm	Sec. 2.21.7.24.3	
heading to compass	Sec. 2.8.2.1.5	
report ivis network	Sec. 2.8.2.1.44	
OBJ VEHICLEID	Sec. 2.9.1.1 See Appendix A	
report cluster vehicle type	Sec. 2.8.2.1.45	
ivis send contact report		
fill sbx_opfor header	Sec. 2.4.3.2.18	
sbx_connection_send_to_port	Sec. 2.4.3.2.19	
buffer deallocate	Sec. 2.14.4.2.15	
vec copy	Sec. 2.6.2.59.1 Vehicles CSCI SDD	

**Table 2.8-141: send\_contact\_report CSU [8.8.2.1.46]**

**2.8.2.1.47 send\_spot\_report CSU**

This CSU sends spot reports for a cluster, both throughout the IVIS network and to the Symbolics.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
cluster	pointer to VEH_CLUSTER	Sec. 2.8.2.2
Calls		
Function	Where Described	
buffer allocate	Sec. 2.14.4.2.12	
tdb_giv_xy_get_utm	Sec. 2.21.7.24.3	
heading to compass	Sec. 2.8.2.1.5	
report ivis network	Sec. 2.8.2.1.44	
OBJ VEHICLEID	Sec. 2.9.1.1 See Appendix A	
report cluster vehicle type	Sec. 2.8.2.1.45	
ivis send spot report		
fill sbx_opfor header	Sec. 2.4.3.2.18	
sbx_connection_send_to_port	Sec. 2.4.3.2.19	
buffer deallocate	Sec. 2.14.4.2.15	
vec copy	Sec. 2.6.2.59.1 Vehicles CSCI SDD	

**Table 2.8-142: send\_spot\_report CSU [8.8.2.1.47]**

**2.8.2.1.48 send\_shelling\_report CSU**

This CSU sends shelling reports for a cluster, both throughout the IVIS network and to the Symbolics.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
shell	pointer to SHELL SUMMARY	Sec. 2.8.2.2
ReturnValues		
Return Value	Type	Meaning
result /* TRUE */	int	Shells still impacting.
result /* FALSE */	int	Shells stopped impacting.
Calls		
Function	Where Described	
buffer allocate	Sec. 2.14.4.2.12	
tdb giv xy get utm	Sec. 2.21.7.24.3	
report ivis network	Sec. 2.8.2.1.44	
OBJ VEHICLEID	Sec. 2.9.1.1 See Appendix A	
ivis send shell report		
fill sbx opfor header	Sec. 2.4.3.2.18	
sbx_connection_send_to_port	Sec. 2.4.3.2.19	
buffer deallocate	Sec. 2.14.4.2.15	

**Table 2.8-143: send\_shelling\_report CSU [8.8.2.1.48]**



**2.8.2.2 reporter.h CSU**

/simnet/src/host/reporter.h

This CSU contains the structures, symbolic constants, and macro definitions (shown in Appendix A) used by the reporter code.

Constant	Value
SHELL_TYPE MORTAR	0
SHELL_TYPE ARTILLERY	1
SHELL_TYPE MINE	2
DEFAULT CLUSTER DISTANCE	1000.0
DEFAULT DECLUSTER DISTANCE	1200.0
DEFAULT SPOT REP RANGE THRESHOLD	1000.0
DEFAULT MAX REAPPEAR LATENCY	(3 * 60 * 1000)
DEFAULT SHELL RANGE THRESHOLD	2000.0
DEFAULT SHELL DISTANCE	1000.0
DEFAULT SHELL LATENCY	(60 * 1000)
DEFAULT REPORT MONITOR TIME	(5 * 60 * 1000)
REPORTER VELOCITY THRESHOLD2	(3.0 * 3.0)
REPORTER MOVEMENT THRESHOLD2	(400.0 * 400.0)
STATIONARY HEADING	(100 * PI)
REPORTER NEW VEHICLE INTERVAL	20000
REPORTER NEW VEHICLE VARIANCE	10000
REPORTER UPDATE INTERVAL	10000
REPORTER UPDATE VARIANCE	1000
NO REPORT NEEDED	0
CONTACT REPORT NEEDED	1
SPOT REPORT NEEDED	2
NON PROMOTABLE SPOT REPORT NEEDED	3

**Table 2.8-144: reporter.h Constant Definitions**

The following typedef struct is tagged SHELL\_SUMMARY.

Item	Type	Where Type Defined
type	int	Standard
num shells	short	Standard
last num shells	short	Standard
time of rep	unsigned int	Standard
time of last shell	unsigned int	Standard
com	VECTOR	sim_types.h
next	pointer to struct shell_summary	This struct
prev	pointer to struct shell_summary	This struct

**Table 2.8-145: SHELL\_SUMMARY Structure Definition**

The following typedef struct is tagged VEH\_ID\_LIST.

Item	Type	Where Type Defined
id	unsigned int	Standard
next	pointer to struct veh_id_list	This struct
prev	pointer to struct veh_id_list	This struct

**Table 2.8-146: VEH\_ID\_LIST Structure Definition**

The following typedef struct is tagged REM\_VEH\_ID\_LIST.

Item	Type	Where Type Defined
id	unsigned int	Standard
time_disappeared	unsigned int	Standard
next	pointer to struct rem_veh_id_list	This struct
prev	pointer to struct rem_veh_id_list	This struct

**Table 2.8-147: REM\_VEH\_ID\_LIST Structure Definition**

The following typedef struct is tagged VEH\_CLUSTER.

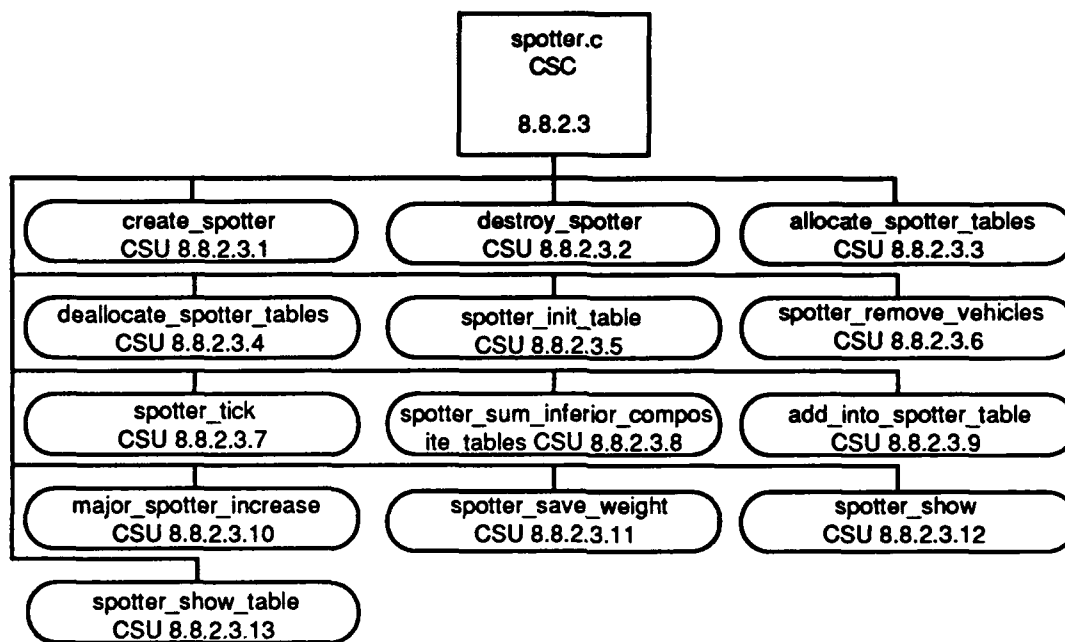
Item	Type	Where Type Defined
report_status	unsigned int	Standard
time_of_rep	unsigned int	Standard
com	VECTOR	sim_types.h
last_com	VECTOR	sim_types.h
delta	VECTOR	sim_types.h
heading	REAL	sim_types.h
num_vehicles	short	Standard
vehicles	pointer to VEH_ID_LIST	Sec. 2.8.2.2
next	pointer to struct veh_cluster	This struct
prev	pointer to struct veh_cluster	This struct

**Table 2.8-148: VEH\_CLUSTER Structure Definition**

### 2.8.2.3 spotter.c CSC

```
/simnet/src/host/spotter.c
```

**This CSC detects enemy vehicles and artillery fire in the area, via a spotter, so they can be reported to the user.**



**Figure 2.8-8: spotter.c CSC Structure**

#### 2.8.2.3.1 create spotter CSU

This CSU allocates a block of memory for a spotter's SPOTTER\_VARS structure and for that spotter's tables, sets spotter's time, sets the spotter's current index and generation count to zero, and returns a pointer to the spotter.

ReturnValues		
Return Value	Type	Meaning
s	pointer to SPOTTER_VARS	Created spotter.
Calls		
Function	Where Described	
allocate_spotter	Sec. 2.9.1.2 See Appendix A	
allocate_spotter_tables	Sec. 2.8.2.3.3	

**Table 2.8-150: create spotter CSU [8.8.2.3.1]**

**2.8.2.3.5 spotter\_init\_table CSU**

This CSU initializes a spotter's vehicle table through a call to clear\_bitfield.

Parameters		
Parameters	Type	Where Typedef Declared
t	pointer to unsigned char	Standard
Calls		
Function	Where Described	
clear_bitfield	Sec. 2.14.3.4.6	

**Table 2.8-154: spotter\_init\_table CSU [8.8.2.3.5]**

**2.8.2.3.6 spotter\_remove\_vehicles CSU**

This CSU removes vehicles from both the spotter's current and old vehicle tables, based on the parameters passed, through calls to clear\_bit.

Parameters		
Parameters	Type	Where Typedef Declared
s	pointer to SPOTTER_VARS	Sec. 2.9.1.2 veh_storage.h
num	int	Standard
v_list[ ]	unsigned int	Standard
Calls		
Function	Where Described	
clear_bit	Sec. 2.14.3.4.4	

**Table 2.8-155: spotter\_remove\_vehicles CSU [8.8.2.3.6]**

**2.8.2.3.7 spotter\_tick CSU**

This CSU is the primary interface to the spotter. At each tick, it checks whether detected vehicles from an inferior vehicles detection structure are actually visible. The visible vehicles are saved in a bitfield. If a vehicle is detected by one inferior vehicle and determined to be visible, it will not be checked for visibility by another inferior vehicle. Only one intervisibility operation is done at each tick.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
force	ForceID	basic.h

**2.8.2.3.2 destroy\_spotter CSU**

This CSU destroys a spotter by deallocating the spotter table memory and spotter memory.

Parameters		
Parameters	Type	Where Typedef Declared
s	pointer to SPOTTER_VARS	Sec. 2.9.1.2 veh storage.h
Calls		
Function	Where Described	
deallocate_spotter_tables	Sec. 2.8.2.3.4	
deallocate_spotter	Sec. 2.9.1.2	

**Table 2.8-151: destroy\_spotter CSU [8.8.2.3.2]**

**2.8.2.3.3 allocate\_spotter\_tables CSU**

This CSU obtains bitfield memory for a spotter's old and current vehicle tables and initializes the tables.

Parameters		
Parameters	Type	Where Typedef Declared
spotter	pointer to SPOTTER_VARS	Sec. 2.9.1.2 veh storage.h
Calls		
Function	Where Described	
allocate_bitfield	Sec. 2.14.3.4.1	
spotter_init_table	Sec. 2.8.2.3.5	

**Table 2.8-152: allocate\_spotter\_tables CSU [8.8.2.3.3]**

**2.8.2.3.4 deallocate\_spotter\_tables CSU**

This CSU deallocates the memory for the spotter's old and current vehicle tables.

Parameters		
Parameters	Type	Where Typedef Declared
spotter	pointer to SPOTTER_VARS	Sec. 2.9.1.2 veh storage.h
Calls		
Function	Where Described	
deallocate_bitfield	Sec. 2.14.3.4.2	

**Table 2.8-153: deallocate\_spotter\_tables CSU [8.8.2.3.4]**

Calls	
Function	Where Described
spotter_init_table	Sec. 2.8.2.3.5
spotter_sum_inferior_composite_tables	Sec. 2.8.2.3.8
extract_bit	Sec. 2.14.3.9 See Appendix A
LOOKUP_VEHICLE	Sec. 2.9.3.2 See Appendix A
is_enemy	Sec. 2.13.3.1 See Appendix A
OBJ_FORCEID	Sec. 2.9.1.1 See Appendix A
OBJ_POSITION	Sec. 2.9.1.1 See Appendix A
is_dead	Sec. 2.13.3.1 See Appendix A
OBJ_APPEARANCE	Sec. 2.9.1.1 See Appendix A
OBJ_VEHICLECLASS	Sec. 2.9.1.1 See Appendix A
intervis_can_see_pt_to_pt	Sec. 2.6.5.2.1
set_bit	Sec. 2.14.3.4.3

Table 2.8-156: spotter\_tick CSU [8.8.2.3.7]

## 2.8.2.3.8 spotter\_sum\_inferior\_composite\_tables CSU

This CSU adds spotter information from an inferior unit to that of a superior unit.

Parameters		
Parameters	Type	Where Typedef Declared
composite	pointer to COMPOSITE_VARS	Sec. 2.9.1.2 veh_storage.h
t	pointer to unsigned char	Standard
Calls		
Function	Where Described	
add_into_spotter_table	Sec. 2.8.2.3.9	

Table 2.8-157: spotter\_sum\_inferior\_composite\_tables CSU [8.8.2.3.8]

## 2.8.2.3.9 add\_into\_spotter\_table CSU

This CSU ORs together the information from the spotter tables.

Parameters		
Parameters	Type	Where Typedef Declared
new_data	pointer to unsigned char	Standard
sum	pointer to unsigned char	Standard
Calls		
Function	Where Described	
or_bitfield	Sec. 2.14.3.4.8	

Table 2.8-158: add\_into\_spotter\_table CSU [8.8.2.3.9]

At this point in the CSC, the spotter detection threshold (difference between new and old weights as a percentage) is declared for use within major\_spotter\_increase CSU.

Constant	Value
SPOTTER DETECTION THRESHOLD	10

**Table 2.8-159: SPOTTER\_DETECTION\_THRESHOLD Constant Definition**

#### 2.8.2.3.10 major\_spotter\_increase CSU

This CSU checks whether the number of vehicles seen by the spotter has increased by at least 10% since the spotter table was last recalculated.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
ReturnValues		
Return Value	Type	Meaning
FALSE	int	No increase in enemy weight, or no spotter.
TRUE	int	Enemy weight increased.
Calls		
Function	Where Described	
DEBUG TARGETING	Sec. 2.5.2.2 See Appendix A	

**Table 2.8-160: major\_spotter\_increase CSU [8.8.2.3.10]**

#### 2.8.2.3.11 spotter\_save\_weight CSU

This CSU checks if the SAF object is a composite with its own SPOTTER\_VARS, a vehicle with a superior that has a SPOTTER\_VARS, or a stranded unit with no spotter. In the former two cases, it saves the spotter's weight as the old weight.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1

**Table 2.8-161: spotter\_save\_weight CSU [8.8.2.3.11]**

**2.8.2.3.12 spotter\_show CSU**

This CSU displays the spotter's current index and generation count along with the old vehicle table and the table currently being computed.

Parameters		
Parameters	Type	Where Typedef Declared
s	pointer to SPOTTER VARS	Sec. 2.9.1.2 veh_storage.h
flags	int	Standard
Calls		
Function	Where Described	
spotter_show_table	Sec. 2.8.2.3.13	

**Table 2.8-162: spotter\_show CSU [8.8.2.3.12]**

**2.8.2.3.13 spotter\_show\_table CSU**

This CSU displays a spotter's old or current vehicle table.

Parameters		
Parameters	Type	Where Typedef Declared
t	pointer to unsigned char	Standard
Calls		
Function	Where Described	
extract_bit	Sec. 2.14.3.9 See Appendix A	

**Table 2.8-163: spotter\_show\_table CSU [8.8.2.3.13]**

**2.8.2.4 spotter.h CSU**

/simnet/src/host/spotter.h

This CSU contains the symbolic constants used by the spotter code.

Constant	Value
DETECTABLE /* Reults of detection */	0
NOT_DETECTABLE	1
NOT_POSSIBLY_VISIBLE	2
NOT_IN_RANGE	3
NOT_ENEMY	4
NOT_THERE	5
DETECTION_TIME_INTERVAL	1000
SPOTTER_TIME_INTERVAL	1000

**Table 2.8-164: spotter.h Constant Definitions**



### 2.8.3 Situation Assessment CSC

The Situation Assessment CSC consists of a single header CSU, tactical\_state.h.

#### 2.8.3.1 tactical\_state.h CSU

/simnet/src/host/tactical\_state.h

This CSU contains structures and symbolic constants used by the information reporting code. It is unused.

Constant	Value
ALL_QUIET	300000
ATTACK_REPORT_DEAD_TIME	60000
TOGETHER_DISTANCE2	25000000
MAX_VEH_TYPES	24

Table 2.8-165: tactical.h Constant Definitions

Item	Type	Where Type Defined
max_fuel	unsigned int	Standard
actual_fuel	unsigned int	Standard
nominal_vehicles	unsigned int	Standard
actual_vehicles	unsigned int	Standard
under_attack_p	unsigned int	Standard
vehicles[MAX_VEH_TYPES]	unsigned int	Standard
altitude	float	Standard

Table 2.8-166: SUB\_STATE\_REPORT Structure Definition

Item	Type	Where Type Defined
x	int	Standard
y	int	Standard
ammo	int	Standard
fuze	int	Standard
rounds	int	Standard

Table 2.8-167: SHELLING\_DESC Structure Definition

## 2.9 SAF OBJECTS CSC

The SAF objects code, a collection of data structures and CSUs, forms the basis on which the executable objects in the SAF simulation are built. These objects are the local vehicles, remote vehicles, and units. The SAF object data structures allow for maintaining the position, SIMNET id, and appearance of all SAF data structures.

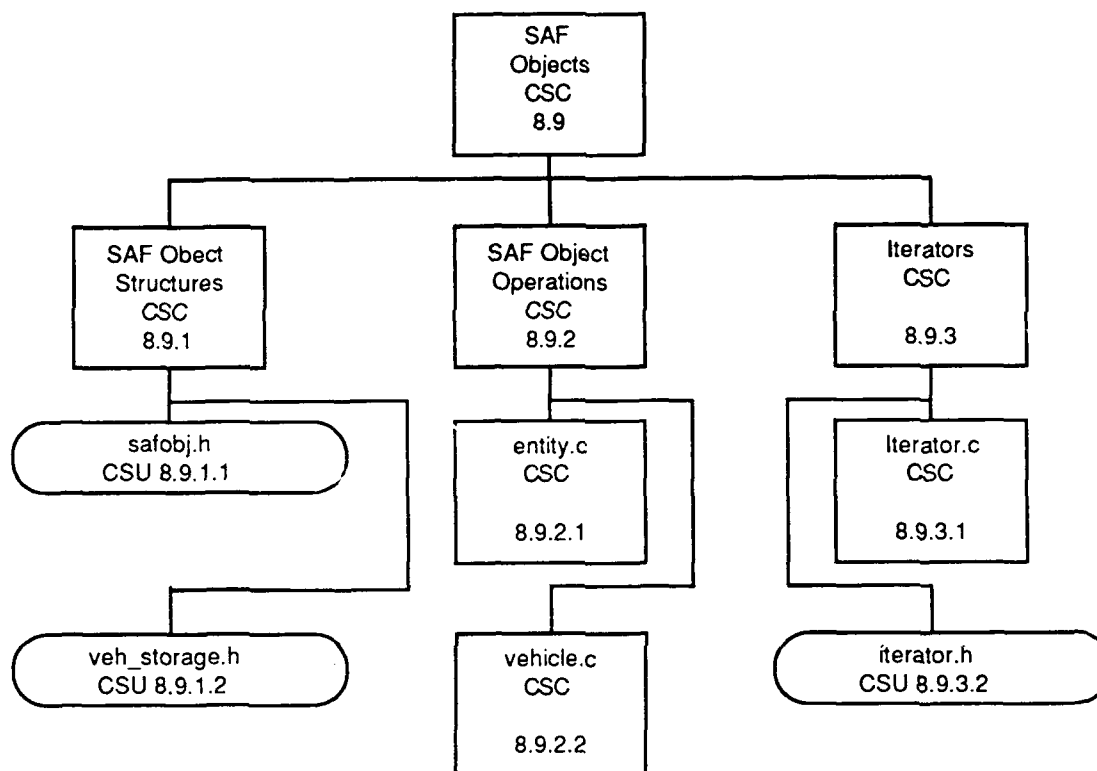


Figure 2.9-1: SAF Objects CSC Structure

### 2.9.1 SAF Object Structures CSC

The SAF Object Structures CSC consists of two header file CSUs, `safobj.h` and `veh_storage.h`. These files contain the structures and macros for the SAF Object CSC.

#### 2.9.1.1 `safobj.h` CSU

`/simnet/src/host/safobj.h`

This CSU contains the `SAF_OBJECT` definition (`typedef struct saf_object`), which contains pointers to all of the other `_VARS` type structures (see Table 2.9-1). It also contains code to gather object information, and lookup macros which are contained in Appendix A.

Item	Type	Where Type Defined
saf_type	unsigned short int	-
tickable	pointer to TICKABLE_VARS	Sec. 2.9.1.2 veh_storage.h
entity	pointer to ENTITY_VARS	Sec. 2.9.1.2 veh_storage.h
vehicle	pointer to VEHICLE_VARS	Sec. 2.9.1.2 veh_storage.h
remote	pointer to REMOTE_VARS	Sec. 2.9.1.2 veh_storage.h
damage	pointer to DAMAGE_VARS	Sec. 2.9.1.2 veh_storage.h
groundveh	pointer to GROUNDVEH_VARS	Sec. 2.9.1.2 veh_storage.h
turret	pointer to TURRET_VARS	Sec. 2.9.1.2 veh_storage.h
targeting	pointer to TARGETING_VARS	Sec. 2.9.1.2 veh_storage.h
weapon_systems	pointer to WEAPON_SYSTEMS_VARS	Sec. 2.9.1.2 veh_storage.h
driver	pointer to DRIVER_VARS	Sec. 2.9.1.2 veh_storage.h
logistics	pointer to LOGISTICS_VARS	Sec. 2.9.1.2 veh_storage.h
saf_vehicle	pointer to SAF_VEHICLE_VARS	Sec. 2.9.1.2 veh_storage.h
composite	pointer to COMPOSITE_VARS	Sec. 2.9.1.2 veh_storage.h
spotter	pointer to SPOTTER_VARS	Sec. 2.9.1.2 veh_storage.h
detection	pointer to DETECTION_VARS	Sec. 2.9.1.2 veh_storage.h
commander	pointer to COMMANDER_VARS	Sec. 2.9.1.2 veh_storage.h
navigator	pointer to NAVIGATOR_VARS	Sec. 2.9.1.2 veh_storage.h
collision	pointer to COLLISION_VARS	Sec. 2.9.1.2 veh_storage.h
reporter	pointer to REPORTER_VARS	Sec. 2.9.1.2 veh_storage.h
airveh	pointer to AIRVEH_VARS	Sec. 2.9.1.2 veh_storage.h
pilot	pointer to PILOT_VARS	Sec. 2.9.1.2 veh_storage.h

Table 2.9-1: SAF\_OBJECT Structure

## 2.9.1.2 veh\_storage.h CSU

/simnet/src/host/veh\_storage.h

This CSU contains the structure definitions used by the entities modeled by this program. These structure definitions follow in tables along with two constant definitions. The CSU also contains the macros which allocate and deallocate each of the structures as needed. These are defined in Appendix A.

Item	Type	Where Type Defined
now	unsigned	Standard
time since new tick	REAL	Sim_types.h
ep	int	Standard
periodic_msecs	unsigned int	Standard
tick_function	FUNC_PTR	

Table 2.9-2: TICKABLE\_VARS Structure Definition

Item	Type	Where Type Defined
vehicleID	unsigned int	Standard
forceID	ForceID	basic.h
owner port number	int	Standard
sbx uniq id	unsigned char	Standard
top unit id	unsigned char	Standard
relative id	unsigned char	Standard
tactics	unsigned char	Standard
icon	int	Standard
direction	VECTOR	sim_types.h
position	VECTOR	sim_types.h
velocity	VECTOR	sim_types.h
simple_rcvg	pointer to SIMPLE_QUEUE	Sec. 2.14.4.3

Table 2.9-3: ENTITY\_VARS Structure Definition

Item	Type	Where Type Defined
vehicleClass	VehicleClass	
appearance	int	Standard
guises	VehicleGuises	basic.h
marking	VehicleMarking	basic.h
capabilities	VehicleCapabilities	basic.h
object type	ObjectType	p_sim.h
network event	short	Standard
turretAzimuth	Angle	basic.h
unElevation	Angle	basic.h
hull to world	T MATRIX	sim-types.h
grid entries	GRID ENTRY LIST	Sec. 2.9.3.2

Table 2.9-4: VEHICLE\_VARS Structure Definition

Item	Type	Where Type Defined
last_appearance	pointer to SimulationPDU	p_sim.h
new_appearance_flag	unsigned short	Standard
last update time	unsigned int	Standard
normal tick rate	unsigned int	Standard
stealth	unsigned short	Standard
next packet to sbx time	unsigned int	Standard
controlling port	int	Standard
being watched : 1	unsigned int	Standard
on road : 1	unsigned int	Standard
last time on road	unsigned int	Standard
last road point	pointer to ROUTEPOINT	Sec. 2.10.2.5
last road index	int	Standard
last watched at	unsigned int	Standard

Table 2.9-5: REMOTE\_VARS Structure Definition

Item	Type	Where Type Defined
df damage table	pointer to DATA UNION	Sec. 2.1.1.5
if damage table	pointer to DATA UNION	Sec. 2.1.1.5
collision damage prob	REAL	sim_types.h

Table 2.9-6: DAMAGE\_VARS Structure Definition

Item	Type	Where Type Defined
hull state	int	Standard
max mps fording	REAL	sim_types.h
max mps hardpack	REAL	sim_types.h
max mps softsoil	REAL	sim_types.h
max mps muck	REAL	sim_types.h
max accel fording	REAL	sim_types.h
max accel hardpack	REAL	sim_types.h
max accel softsoil	REAL	sim_types.h
max accel muck	REAL	sim_types.h
max accel braking	REAL	sim_types.h
skew matrix	T MATRIX	sim_types.h
last soil type	int	Standard

Table 2.9-7: GROUNDVEH\_VARS Structure Definition

The following structure is tagged TURRET\_VARS.

Item	Type	Where Type Defined
scan state	int	Standard
turret trashed	int	Standard
next start time	unsigned int	Standard
max elevation	REAL	sim_types.h
min elevation	REAL	sim_types.h
max azimuth rps	REAL	sim_types.h
max elevate rps	REAL	sim_types.h
scan azimuth rps	REAL	sim_types.h
scan elevate rps	REAL	sim_types.h
current azimuth	REAL	sim_types.h
desired azimuth	REAL	sim_types.h
azimuth rps	REAL	sim_types.h
current elevation	REAL	sim_types.h
desired elevation	REAL	sim_types.h
elevation rps	REAL	sim_types.h
scan left limit	REAL	sim_types.h
scan right limit	REAL	sim_types.h
hull interest dir	VECTOR	sim_types.h
hull turret offset	VECTOR	sim_types.h

Table 2.9-8: TURRET\_VARS Structure Definition

The following structure is TARGETING\_VARS.

Item	Type	Where Type Defined
firestatus	unsigned char	Standard
target	unsigned short	Standard
target_list[MAX_TARGETS]	unsigned short	Standard
position	VECTOR	sim types.h
position_radius2	REAL	sim types.h
position_valid	short	Standard
attack_role	unsigned char	Standard
view_type	unsigned char	Standard
max_vision_range2	REAL	sim types.h
num_vision_grids	unsigned short	Standard
max_engagement_range2	REAL	sim types.h
marksmanship	REAL	sim types.h
next_tl_time	unsigned int	Standard
tl_recompute_time	unsigned int	Standard
tl_outdated	unsigned char	Standard
targeting_superior	unsigned short	Standard
chosen_weapon	unsigned char	Standard
selected_weapon	unsigned char	Standard
gunner_state	unsigned char	Standard
gunner_target	unsigned short	Standard
gunner_start_time	unsigned int	Standard
old_weight	int	Standard

**Table 2.9-9: TARGETING\_VARS Structure Definition**

The following structure is tagged WEAPON\_VARS.

Item	Type	Where Type Defined
state	int	Standard
start time	unsigned int	Standard
attackerID	unsigned short	Standard
weapon_name	pointer to char	Standard
hitmodel	pointer to DATA_UNION	Sec. 2.1.1.5
round type	ObjectType	p_sim.h
detonator	ObjectType	p_sim.h
jink radius2	REAL	sim_types.h
min_range2	REAL	sim_types.h
max_range2	REAL	sim_types.h
muzzle length	REAL	sim_types.h
muzzle height	REAL	sim_types.h
muzzle offset	REAL	sim_types.h
round velocity	REAL	sim_types.h
mass	REAL	sim_types.h
directionality	REAL	sim_types.h
max rounds	unsigned int	Standard
rounds left	unsigned int	Standard
rounds loaded	unsigned int	Standard
select time	unsigned int	Standard
load time	unsigned int	Standard
acquire time	unsigned int	Standard
track time	unsigned int	Standard
lose sight time	unsigned int	Standard
does flyout	unsigned char	Standard
uses turret	unsigned char	Standard
track while flying	unsigned char	Standard
radiate	unsigned char	Standard
radar frequency	REAL	sim_types.h
radar power	REAL	sim_types.h
antenna gain	REAL	sim_types.h
pulse energy	REAL	sim_types.h
last radiate time	unsigned int	Standard
burst description	GUN_BURST_DESCRIPTION	
missile	pointer to MISSILE_VARS	Sec. 2.9.1.2

Table 2.9-10: WEAPON\_VARS Structure Definition

The following structure is tagged WEAPON\_PRIORITY\_LIST.

Item	Type	Where Type Defined
count	int	Standard
list[MAX WEAPONS]	unsigned char	Standard

Table 2.9-11: WEAPON\_PRIORITY\_LIST Structure Definition

The following structure is tagged WEAPON\_SYSTEMS\_VARS.

Item	Type	Where Type Defined
max_weapons	unsigned char	Standard
default_weapons	unsigned char	Standard
weapons[MAX_WEAPONS]	WEAPON_VARS	Sec. 2.9.1.2
tank_priority_list	WEAPON PRIORITY LIST	Sec. 2.9.1.2
air_priority_list	WEAPON PRIORITY LIST	Sec. 2.9.1.2
ground_priority_list	WEAPON PRIORITY LIST	Sec. 2.9.1.2

**Table 2.9-12: WEAPON\_SYSTEMS\_VARS Structure Definition**

Item	Type	Where Type Defined
immediate	int	Standard
imleadveh	pointer to struct saf_object	
imstationoffset	VECTOR	sim_types.h
imheading	VECTOR	sim_types.h
imdestpoint	VECTOR	sim_types.h
im_follow_on_road_point	pointer to ROUTEPOINT	Sec. 2.10.2.5
im_forp_dir	int	Standard
mission	int	Standard
leadveh	pointer to struct saf_object	Sec. 2.9.1.1
stationoffset	VECTOR	sim_types.h
follow_on_road_point	pointer to ROUTEPOINT	Sec. 2.10.2.5
forp_dir	int	Standard
direction	int	Standard
routedirection	int	Standard
maxerr2	REAL	sim_types.h
useimspeed	int	Standard
speed	REAL	sim_types.h
route	pointer to ROUTE	Sec. 2.10.2.5
routepoint	pointer to ROUTEPOINT	Sec. 2.10.2.5
debug	int	Standard
desired_speed	REAL	sim_types.h
desired_direction	VECTOR	sim_types.h

**Table 2.9-13: DRIVER\_VARS Structure Definition**



Item	Type	Where Type Defined
range remaining	REAL	sim_types.h
max vehicle range	REAL	sim_types.h
model base adjustment	REAL	sim_types.h
speed mps	REAL	sim_types.h
max speed mps	REAL	sim_types.h
max turns rps	REAL	sim_types.h
vehicleStatus	int	Standard
superior	pointer to struct saf_object	Sec. 2.9.1.1
job	pointer to char	Standard
update_thresholds	pointer to DiscrepancyThresholds	libapp.h
last_update	pointer to SimulationPDU	p_sim.h
dimensions	VECTOR	sim_types.h
max waypt error	REAL	sim_types.h
max waypt error squared	REAL	sim_types.h
desired direction	VECTOR	sim_types.h
desired speed	REAL	sim_types.h
last position	VECTOR	sim_types.h
orderer	pointer to struct saf_object	
executing_mission	unsigned short	Standard
desired_velocity	VECTOR	sim_types.h
stealthy_mimic	unsigned int	Standard
max_times_between_apps	unsigned int	Standard

Table 2.9-14: SAF\_VEHICLE\_VARS Structure Definition

The following structure is tagged NAVIGATOR\_VARS.

Item	Type	Where Type Defined
current_overlay	pointer to OVERLAY	Sec. 2.10.2.2
control_measures	pointer to CONTROL_MEASURE_LIST	Sec. 2.10.2.2
last_x	INT32	Sec. 2.12.1.18
last_y	INT32	Sec. 2.12.1.18

Table 2.9-15: NAVIGATOR\_VARS Structure Definition

At this point in veh\_storage.h, two constants are defined for use in the next structure.

Constant	Value
MAX COMPOSITE WIDTH	8
MAX UNIT SIZE	20

Table 2.9-16: veh\_storage.h Constant Definitions

The following structure is tagged COMPOSITE\_VARS.

Item	Type	Where Type Defined
superior	pointer to struct saf_object	Sec. 2.9.1.1
inferior_composites [MAX_COMPOSITE_WIDTH]	pointer to struct saf_object	Sec. 2.9.1.1
num inferior composites	unsigned short	Standard
inferior_vehicles [MAX_UNIT_SIZE]	pointer to struct saf_object	Sec. 2.9.1.1
num inferior vehicles	unsigned short	Standard
member_vehicles [MAX_UNIT_SIZE]	pointer to struct saf_object	Sec. 2.9.1.1
num member vehicles	unsigned short	Standard
echelon	pointer to char	Standard
echelon_type	pointer to char	Standard
echelon as int	unsigned short	Standard
echelon_type as int	unsigned short	Standard
formation table	pointer to DATA UNION	Sec. 2.1.1.5
leading vehicle	pointer to struct saf_object	Sec. 2.9.1.1
prev lead veh	pointer to struct saf_object	Sec. 2.9.1.1
marking	VehicleMarking	basic.h
form_xoffset	int	Standard
formation	pointer to char	Standard
combat instruction set	pointer to CIS	
predicates	pointer to PREDICATES	
cis table	pointer to DATA UNION	Sec. 2.1.1.5
num living vehicles	unsigned short	Standard
below fifty	unsigned char	Standard
below twenty five	unsigned char	Standard

Table 2.9-17: COMPOSITE\_VARS Structure Definition

The following structure is tagged LOGISTICS\_VARS.

Item	Type	Where Type Defined
status	unsigned char	Standard
logistics state	unsigned char	Standard
full	unsigned char	Standard
canceled	unsigned char	Standard
current loading	ObjectType	p_sim.h
current load qty	float	Standard
supplier id	unsigned int	Standard
end time	unsigned int	Standard
timeout time	unsigned int	Standard
mun_offerQ	pointer to MunitionQuantity	basic.h

Table 2.9-18: LOGISTICS\_VARS Structure Definition

The following structure is tagged SPOTTER\_VARS.

Item	Type	Where Type Defined
last spotter time	unsigned int	Standard
current index	unsigned short	Standard
generation count	unsigned short	Standard
vehicle table	pointer to unsigned char	Standard
old vehicle table	pointer to unsigned char	Standard
spotter weight	int	Standard
old spotter weight	int	Standard

**Table 2.9-19: SPOTTER\_VARS Structure Definition**

The following structure is tagged DETECTION\_VARS.

Item	Type	Where Type Defined
last detection time	unsigned int	Standard
generation count	unsigned int	Standard
detection weight	int	Standard
old detection weight	int	Standard
detection table[MAX_VEH]	char	Standard
detection probs[MAX_VEH]	char	Standard

**Table 2.9-20: DETECTION\_VARS Structure Definition**

The following structure is tagged COLLISION\_VARS.

Item	Type	Where Type Defined
state	unsigned short	Standard
disabled	unsigned short	Standard
secs until collision	REAL	sim_types.h
vehicle to avoid	pointer to struct saf_object	Sec. 2.9.1.1
vehicle to avoids velocity	VECTOR	sim_types.h
reaction time	REAL	sim_types.h
vehicle hit	int	Standard
vehicle hits position	VECTOR	sim_types.h
vehicle hits velocity	VECTOR	sim_types.h
ret to avoid	RECT	Sec. 2.14.3.9
last x checked	int	Standard
last y checked	int	Standard
avoidance speed	REAL	sim_types.h

**Table 2.9-21: COLLISION\_VARS Structure Definition**

Item	Type	Where Type Defined
type	int	Standard
crashing_state	int	Standard
landed	int	Standard
desired_velocity	VECTOR	sim_types.h
altitude_agl	REAL	sim_types.h
model_offset	REAL	sim_types.h
ground_level	REAL	sim_types.h
orientation	VECTOR	sim_types.h
desired_orientation	VECTOR	sim_types.h
hull_desired_velocity	VECTOR	sim_types.h
hull_current_velocity	VECTOR	sim_types.h
vehicle_mass	REAL	sim_types.h
engine_power	REAL	sim_types.h
power_factor	REAL	sim_types.h
max_pitch	REAL	sim_types.h
max_roll	REAL	sim_types.h
max_mps_forward	REAL	sim_types.h
min_mps_forward	REAL	sim_types.h
max_mps_landing	REAL	sim_types.h
max_mps_takeoff	REAL	sim_types.h
roll_damping	REAL	sim_types.h
pitch_damping	REAL	sim_types.h
dx2roll	REAL	sim_types.h
roll2dazimuth	REAL	sim_types.h
y_drag	REAL	sim_types.h
roll_ydrag	REAL	sim_types.h
xz_drag	REAL	sim_types.h
roll_gain	REAL	sim_types.h
power_gain	REAL	sim_types.h
pitch_gain	REAL	sim_types.h
lift	REAL	sim_types.h
pitch_inertia	REAL	sim_types.h
roll_inertia	REAL	sim_types.h
dz2pitch	REAL	sim_types.h
max_aircraft_power	REAL	sim_types.h
drag	VECTOR	sim_types.h
ss_drag	VECTOR	sim_types.h
force	VECTOR	sim_types.h
torque	VECTOR	sim_types.h
acceration	VECTOR	sim_types.h
angular_velocity	VECTOR	sim_types.h
angular_acceleration	VECTOR	sim_types.h

Table 2.9-23: AIRVEH\_VARS Structure Definition

Item	Type	Where Type Defined
type	int	Standard
crashing state	int	Standard
landed	int	Standard
desired velocity	VECTOR	sim_types.h
altitude agl	REAL	sim_types.h
model offset	REAL	sim_types.h
ground level	REAL	sim_types.h
orientation	VECTOR	sim_types.h
desired orientation	VECTOR	sim_types.h
hull desired velocity	VECTOR	sim_types.h
hull current velocity	VECTOR	sim_types.h
vehicle mass	REAL	sim_types.h
engine power	REAL	sim_types.h
power factor	REAL	sim_types.h
max pitch	REAL	sim_types.h
max roll	REAL	sim_types.h
max mps forward	REAL	sim_types.h
min mps forward	REAL	sim_types.h
max mps landing	REAL	sim_types.h
max mps takeoff	REAL	sim_types.h
roll damping	REAL	sim_types.h
pitch damping	REAL	sim_types.h
dx2roll	REAL	sim_types.h
roll2dazimuth	REAL	sim_types.h
y drag	REAL	sim_types.h
roll ydrag	REAL	sim_types.h
xz drag	REAL	sim_types.h
roll gain	REAL	sim_types.h
power gain	REAL	sim_types.h
pitch gain	REAL	sim_types.h
lift	REAL	sim_types.h
pitch inertia	REAL	sim_types.h
roll inertia	REAL	sim_types.h
dz2pitch	REAL	sim_types.h
max aircraft power	REAL	sim_types.h
drag	VECTOR	sim_types.h
ss drag	VECTOR	sim_types.h
force	VECTOR	sim_types.h
torque	VECTOR	sim_types.h
acceration	VECTOR	sim_types.h
angular velocity	VECTOR	sim_types.h
angular acceleration	VECTOR	sim_types.h

Table 2.9-23: AIRVEH\_VARS Structure Definition

Item	Type	Where Type Defined
type	int	Standard
im	AIR SM /* state machines */	
mis	AIR SM /* state machines */	
useimspeed	int /* override variables */	Standard
useimaltitude	int	Standard
useimcis	int	Standard
useimform	int	Standard
firetimeout	unsigned int /* fire at will */	Standard
runtimeout	unsigned int /* variables */	Standard
fireat state	int	Standard
firespeed	REAL	sim_types.h
runspeed	REAL	sim_types.h
firealt	REAL	sim_types.h
runalt	REAL	sim_types.h
tfire	unsigned int	Standard
trun	unsigned int	Standard
tooclose2	REAL	sim_types.h
oldalt	REAL	sim_types.h
oldspeed	REAL	sim_types.h
target point	VECTOR /* targeting */	sim_types.h
popup point	VECTOR /* variables */	sim_types.h
setup point	VECTOR	sim_types.h
targetid	unsigned short	Standard
dir to target	VECTOR	sim_types.h
target range2	REAL	sim_types.h
valid target	int	Standard
new target	int	Standard
point at target called	int	Standard
max target offset2	REAL	sim_types.h
max cos err2	REAL	sim_types.h
hoverattack time	unsigned int	Standard
hoverattack alt	REAL	sim_types.h
hoverattack timeout	unsigned int	Standard
hoverattack radius	REAL	sim_types.h
airport	VECTOR	sim_types.h
takeoff altitude	REAL	sim_types.h
debug	int	Standard
desired velocity	VECTOR	sim_types.h

Table 2.9-24: PILOT\_VARS Structure Definition

The following structure is tagged **COMMANDER\_VARS**.

Item	Type	Where Type Defined
state	unsigned short	Standard
has_mission : 1	unsigned int	Standard
mission_formation	pointer to char	Standard
override_formation	pointer to char	Standard
noted_leader	pointer to struct saf_object	Sec. 2.9.1.1
union		
}		
driver	DRIVER_VARS	Sec. 2.9.1.2
pilot	PILOT_VARS	Sec. 2.9.1.2
} leaders_brain		
overlay_name	pointer to char	Standard
route_name	pointer to char	Standard
mimic_vehicle	unsigned int	Standard

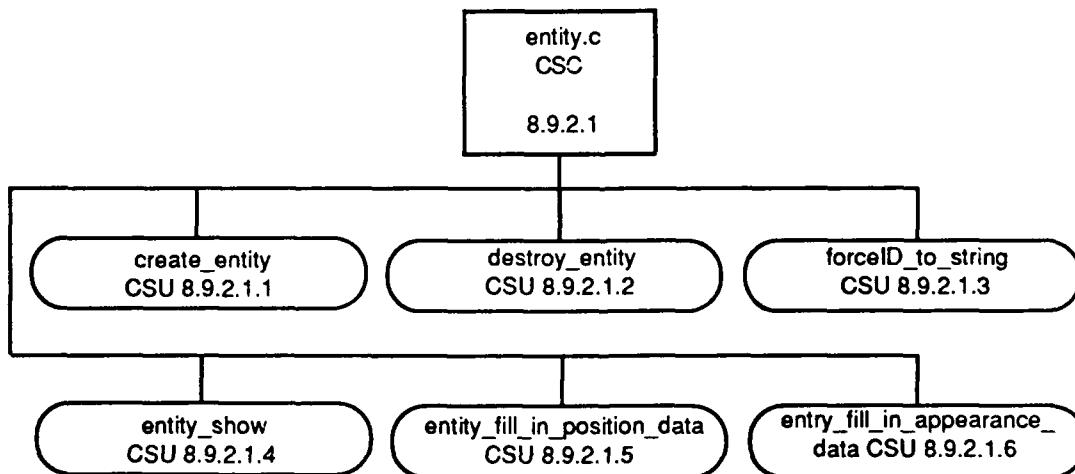
**Table 2.9-25: COMMANDER\_VARS Structure Definition**

## 2.9.2 SAF Object Operations CSC

### 2.9.2.1 entity.c CSC

/simnet/src/host/entity.c

This CSC contains the code which creates and destroys entities. (An entity is a vehicle or a composite which is used to organize sets of vehicles. It is effectively any object which is not part of the terrain database, which is being handled by the Simhost program.) The CSC also contains any entity-specific CSUs.



**Figure 2.9-2: entity.c CSC Structure**

### 2.9.2.1.1 create\_entity CSU

This CSU creates an entity based on the characteristics passed in the parameters. An entity is any first-class object maintained by the phantom program. This includes opfor vehicles, missiles, composites and remote vehicles.

Parameters		
Parameters	Type	Where Typedef Declared
id	unsigned int	Standard
forceID	ForceID	basic.h
heading	REAL	sim_types.h
position	pointer to REAL	sim_types.h
owner	pointer to SBX_CONNECTION_VARS	Sec. 2.4.3.3
icon	unsigned short	Standard
tactics	unsigned short	Standard
ReturnValues		
Return Value	Type	Meaning
entity	pointer to ENTITY_VARS	Pointer to created entity
Calls		
Function	Where Described	
allocate_entity	Sec. 2.9.1.2	
vec copy	Sec. 2.14.3.5.17	
tdb get gl	Sec. 2.14.1.2.2	
vec init	Sec. 2.6.2.61.1 Vehicles CSCI SDD	
simple queue allocate	Sec. 2.14.2.1.7	

Table 2.9-26: create\_entity CSU [8.9.2.1.1]

### 2.9.2.1.2 destroy\_entity CSU

This CSU destroys an entity by flushing it from the queue, deallocating its queue and structure memory heaps.

Parameters		
Parameters	Type	Where Typedef Declared
entity	pointer to ENTITY_VARS	Sec. 2.9.1.2
Calls		
Function	Where Described	
buffer simple flush	Sec. 2.14.4.1.16	
simple queue deallocate	Sec. 2.14.4.1.8	
deallocate_entity	Sec. 2.9.1.2 See Appendix A	

Table 2.9-27: destroy\_entity CSU [8.9.2.1.2]



**2.9.2.1.3 forceID\_to\_string CSU**

This CSU provides a pointer to the character string for the provided force ID value.

Parameters		
Parameters	Type	Where Typedef Declared
force	ForceID	basic.h
ReturnValues		
Return Value	Type	Meaning
"distinguished"	pointer to char	distinguishedForceID
"other"	pointer to char	otherForceID
"observer"	pointer to char	observerForceID
"target"	pointer to char	targetForceID
"unknown"	pointer to char	None of the above

Table 2.9-28: forceID\_to\_string CSU [8.9.2.1.3]

**2.9.2.1.4 entity\_show CSU**

This CSU displays data on the entity passed as a parameter, including identification, location, speed and direction.

Parameters		
Parameters	Type	Where Typedef Declared
entity	pointer to ENTITY_VARS	Sec. 2.9.1.2
flags	int	Standard
Calls		
Function	Where Described	
forceID to string	Sec. 2.9.2.1.3	
print_vector	Sec. 2.14.3.5.2	

Table 2.9-29: entity\_show CSU [8.9.2.1.4]

**2.9.2.1.5 entity\_fill\_in\_position\_data CSU**

This CSU calculates and fills in the VEHICLE\_POSITON\_DESCRIPTOR position data from the position and direction information passed in via pointer to the ENTITY\_VARS.

Parameters		
Parameters	Type	Where Typedef Declared
entity	pointer to ENTITY_VARS	Sec. 2.9.1.2
desc_ptr	pointer to VEHICLE_POSITION_DESCRIPTOR	Sec. 2.4.1.1
Calls		
Function	Where Described	
s_atan2	Sec. 2.14.3.9 See Appendix A	

Table 2.9-30: entity\_fill\_in\_position\_data CSU [8.9.2.1.5]

### 2.9.2.1.6 entity\_fill\_in\_appearance\_data CSU

This CSU fills in the `VEHICLE_APPEARANCE_DESCRIPTOR` appearance data from the entity information passed in via the pointer to the `ENTITY_VARS`.

Parameters		
Parameters	Type	Where Typedef Declared
entity	pointer to <code>ENTITY_VARS</code>	Sec. 2.9.1.2
desc_ptr	pointer to <code>VEHICLE_APPEARANCE_DESCRIPTOR</code>	Sec. 2.4.1.1

Table 2.9-31: entity\_fill\_in\_appearance\_data CSU [8.9.2.1.6]

### 2.9.2.2 vehicle.c CSC

/simnet/src/host/vehicle.c

This CSC handles creating, deleting, and filling in the information associated with all vehicles.

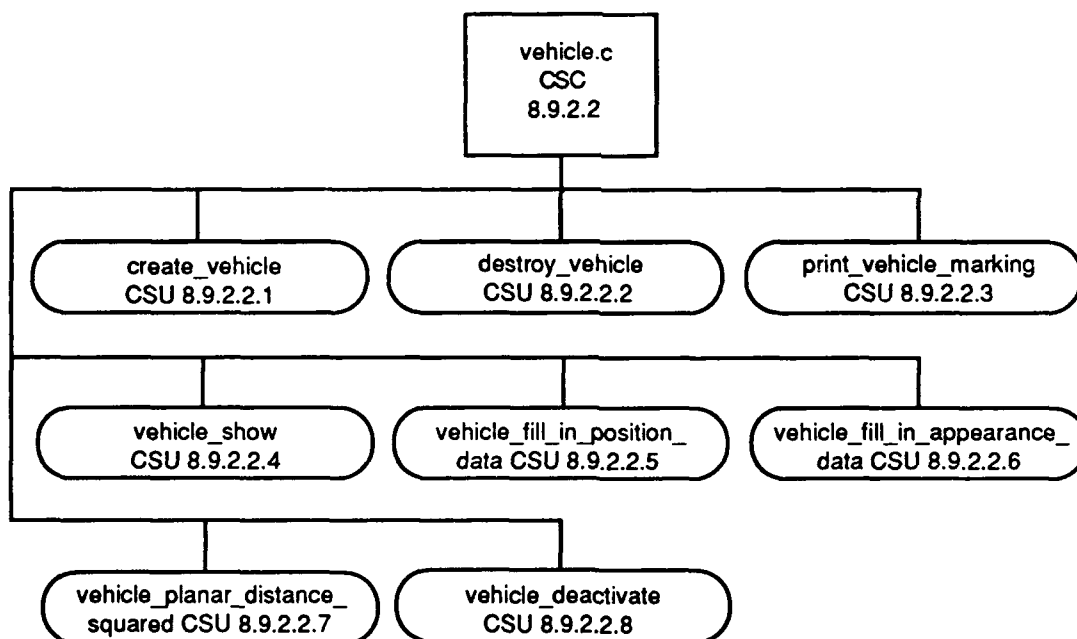


Figure 2.9-3: vehicle.c CSC Structure

**2.9.2.2.1 create\_vehicle CSU**

This CSU creates a vehicle by obtaining memory for a VEHICLE\_VARS structure, setting the class to vehicleClassSimple and initializing the other elements.

ReturnValues		
Return Value	Type	Meaning
vehicle	pointer to VEHICLE_VARS	Sec. 2.9.1.2
Calls		
Function	Where Described	
allocate_vehicle	Sec. 2.9.1.2	
mat_ident_init	Sec. 2.6.2.31.1 Vehicles CSCI SDD	

**Table 2.9-32: create\_vehicle CSU [8.9.2.2.1]**

**2.9.2.2.2 destroy\_vehicle CSU**

This CSU destroys the vehicle passed by calling deallocate\_vehicle to release the VEHICLE\_VARS structure's memory.

Parameters		
Parameters	Type	Where Typedef Declared
vehicle	pointer to VEHICLE_VARS	Sec. 2.9.1.2
Calls		
Function	Where Described	
deallocate_vehicle	Sec. 2.9.1.2	

**Table 2.9-33: destroy\_vehicle CSU [8.9.2.2.2]**

**2.9.2.2.3 print\_vehicle\_marking CSU**

This CSU prints the marking of the vehicle passed.

Parameters		
Parameters	Type	Where Typedef Declared
marking	pointer to VehicleMarking	basic.h

**Table 2.9-34: print\_vehicle\_marking CSU [8.9.2.2.3]**

**2.9.2.2.4 vehicle\_show CSU**

This CSU prints vehicle information including identification, type, appearance, conditions, and marking based on the passed ENTITY\_VARS and VEHICLE\_VARS structures.

Parameters		
Parameters	Type	Where Typedef Declared
entity	pointer to ENTITY_VARS	Sec. 2.9.1.2
vehicle	pointer to VEHICLE_VARS	Sec. 2.9.1.2
flags	int	Standard
Calls		
Function	Where Described	
simnet_id_string_from_saf_id		
print_vehicle_marking	Sec. 2.9.2.2.3	

**Table 2.9-35: vehicle\_show CSU [8.9.2.2.4]**

**2.9.2.2.5 vehicle\_fill\_in\_position\_data CSU**

This CSU calculates and fills in the VEHICLE\_POSITION\_DESCRIPTOR structure's turret angle.

Parameters		
Parameters	Type	Where Typedef Declared
vehicle	pointer to VEHICLE_VARS	Sec. 2.9.1.2
entity	pointer to ENTITY_VARS	Sec. 2.9.1.2
desc_ptr	pointer to VEHICLE_POSITION_DESCRIPTOR	Sec. 2.4.1.1
Calls		
Function	Where Described	
angle_clip	Sec. 2.14.3.5.7	
s_atan2	Sec. 2.14.3.9 See Appendix A	
simnet_angle_to_radians	libapp.h	

**Table 2.9-36: vehicle\_fill\_in\_position\_data CSU [8.9.2.2.5]**

**2.9.2.2.6 vehicle\_fill\_in\_appearance\_data CSU**

This CSU fills in the VEHICLE\_APPEARANCE\_DESCRIPTOR structure's appearance data.

Parameters		
Parameters	Type	Where Typedef Declared
vehicle	pointer to VEHICLE_VARS	Sec. 2.9.1.2
desc_ptr	pointer to VEHICLE_APPEARANCE_DESCRIPTOR	Sec. 2.4.1.1

**Table 2.9-37: vehicle\_fill\_in\_appearance\_data CSU [8.9.2.2.6]**

**2.9.2.2.7 vehicle\_planar\_distance\_squared CSU**

This CSU returns the square of the entity vehicle planar distance through a call to `range_squared`.

Parameters		
Parameters	Type	Where Typedef Declared
entity	pointer to ENTITY_VARS	Sec. 2.9.1.2
location	pointer to REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
range_squared(location, entity->position)	REAL	Square of the vehicle planar distance
Calls		
Function	Where Described	
range_squared	Sec. 2.14.3.5.10	

**Table 2.9-38: vehicle\_planar\_distance\_squared CSU [8.9.2.2.7]**

**2.9.2.2.8 vehicle\_deactivate CSU**

This CSU deactivates a vehicle through a call to `simnet_send_deactivate`.

Parameters		
Parameters	Type	Where Typedef Declared
entity	pointer to ENTITY_VARS	Sec. 2.9.1.2
Calls		
Function	Where Described	
simnet_send_deactivate		

**Table 2.9-39: vehicle\_deactivate CSU [8.9.2.2.8]**

**2.9.3 Iterators CSC**

The Iterators CSC consists of a CSC, `iterator.c`, and a CSU, `iterator.h`.

**2.9.3.1 iterator.c CSC**

`/simnet/src/host/iterator.c`

This CSC maintains grid lists which help cut down on the amount of searching through vehicle tables done each time a vehicle tries to find out who it can see. It also maintains some basic information on vehicles to speed other things as well.

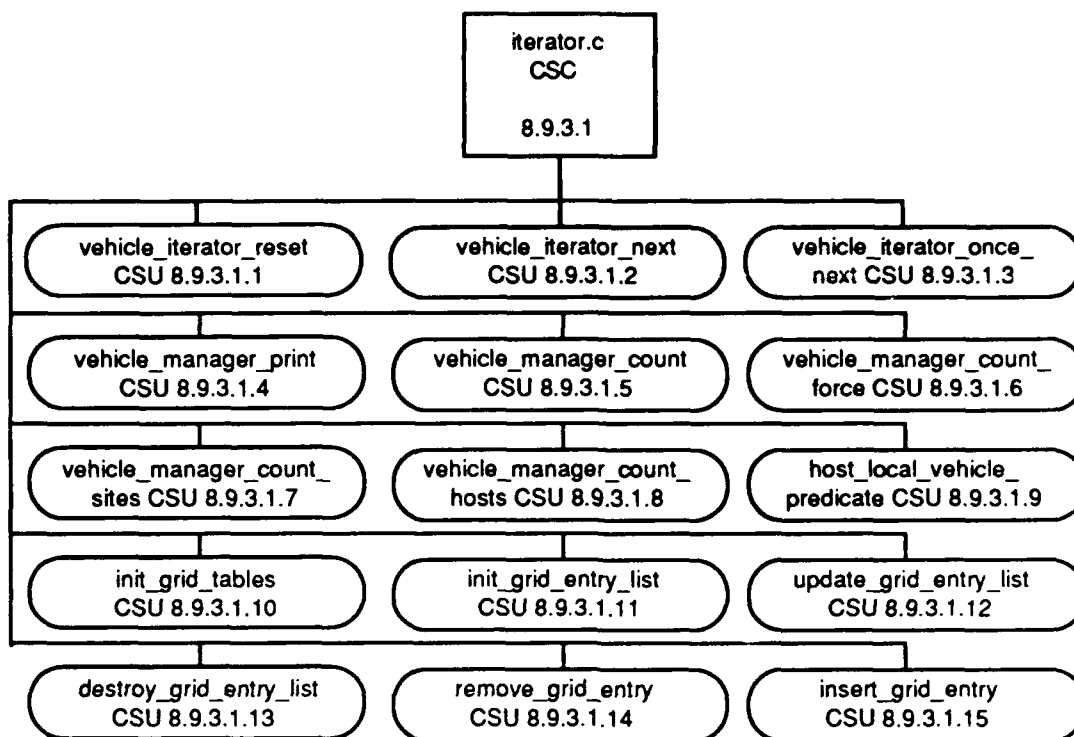


Figure 2.9-4: iterator.c CSC Structure

### 2.9.3.1.1 vehicle\_iterator\_reset CSU

This CSU resets the iterator passed by setting the next element (iterator->next) to zero and the match\_type element to the type passed.

Parameters		
Parameters	Type	Where Typedef Declared
iterator	pointer to VEHICLE_ITERATOR	Sec. 2.9.3.2
type	unsigned short	Standard

Table 2.9-40: vehicle\_iterator\_reset CSU [8.9.3.1.1]

### 2.9.3.1.2 vehicle\_iterator\_next CSU

This CSU returns the next SAF object in the iterator list which is of the same vehicle type as that which was passed in. It stops searching if it has passed through the entire list.

Parameters		
Parameters	Type	Where Typedef Declared
iterator	pointer to VEHICLE_ITERATOR	Sec. 2.9.3.2

ReturnValues		
Return Value	Type	Meaning
0	int	id found is the start id
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
LOOKUP SAFOBJ	Sec. 2.9.1.1 See Appendix A	
type_ok	Sec. 2.9.3.2 See Appendix A	

Table 2.9-41: vehicle\_iterator\_next CSU [8.9.3.1.2]

### 2.9.3.1.3 vehicle\_iterator\_once\_next CSU

This CSU returns the next SAF object in the iterator list which is of the same vehicle type as that which was passed in. It stops searching if it reaches an ID of MAX\_VEH.

Parameters		
Parameters	Type	Where Typedef Declared
iterator	pointer to VEHICLE_ITERATOR	Sec. 2.9.3.2
ReturnValues		
Return Value	Type	Meaning
0	int	id found is the start id
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
LOOKUP SAFOBJ	Sec. 2.9.1.1 See Appendix A	
type_ok	Sec. 2.9.3.2 See Appendix A	

Table 2.9-42: vehicle\_iterator\_once\_next CSU [8.9.3.1.3]

### 2.9.3.1.4 vehicle\_manager\_print CSU

This CSU prints the id for all vehicles of the selected type, as well as the total number of such vehicles.

Parameters		
Parameters	Type	Where Typedef Declared
type	int	Standard
Calls		
Function	Where Described	
LOOKUP SAFOBJ	Sec. 2.9.1.1 See Appendix A	
type_ok	Sec. 2.9.3.2 See Appendix A	

Table 2.9-43: vehicle\_manager\_print CSU [8.9.3.1.4]

**2.9.3.1.5 vehicle\_manager\_count CSU**

This CSU counts the number of vehicles of the type passed as the parameter, and returns the count.

Parameters		
Parameters	Type	Where Typedef Declared
type	int	Standard
ReturnValues		
Return Value	Type	Meaning
count	int	vehicle count
Calls		
Function	Where Described	
LOOKUP_SAFOBJ	Sec. 2.9.1.1 See Appendix A	
type_ok	Sec. 2.9.3.2 See Appendix A	

**Table 2.9-44: vehicle\_manager\_count CSU [8.9.3.1.5]**

**2.9.3.1.6 vehicle\_manager\_count\_force CSU**

This CSU counts the number of force vehicles of the type passed as the parameter, and returns the count.

Parameters		
Parameters	Type	Where Typedef Declared
force	ForceID	basic.h
ReturnValues		
Return Value	Type	Meaning
count	int	Number of force vehicles
Calls		
Function	Where Described	
LOOKUP_VEHICLE	Sec. 2.9.3.2 See Appendix A	
LOOKUP_FORCEID	Sec. 2.9.1.1 See Appendix A	

**Table 2.9-45: vehicle\_manager\_count\_force CSU [8.9.3.1.6]**

**2.9.3.1.7 vehicle\_manager\_count\_sites CSU**

This CSU updates the site table.

Parameters		
Parameters	Type	Where Typedef Declared
site_table[ ]	short	Standard



Calls	
Function	Where Described
LOOKUP_VEHICLE	Sec. 2.9.3.2 See Appendix A
simnet id from saf id	

Table 2.9-46: vehicle\_manager\_count\_sites CSU [8.9.3.1.7]

## 2.9.3.1.8 vehicle\_manager\_count\_hosts CSU

This CSU updates the host table.

Parameters		
Parameters	Type	Where Typedef Declared
site	int	Standard
host_table[ ]	short	Standard
Calls		
Function	Where Described	
LOOKUP_VEHICLE	Sec.2.9.3.2 See Appendix A	
simnet id from saf id		

Table 2.9-47: vehicle\_manager\_count\_hosts CSU [8.9.3.1.8]

## 2.9.3.1.9 host\_local\_vehicle\_predicate CSU

This CSU returns a value which indicates whether the Vehicle ID passed is a local vehicle.

Parameters		
Parameters	Type	Where Typedef Declared
id	int	Standard
ReturnValues		
Return Value	Type	Meaning
safobj	pointer to SAF_OBJECT	
Calls		
Function	Where Described	
LOOKUP_SAFOBJ	Sec. 2.9.1.1 See Appendix A	
type_ok	Sec. 2.9.3.2 See Appendix A	

Table 2.9-48: host\_local\_vehicle\_predicate CSU [8.9.3.1.9]

## 2.9.3.1.10 init\_grid\_tables CSU

This CSU calculates the grid table height, width and size for all grid tables, puts the data into three arrays for that grid, obtains the memory heap required for each grid table and clears the memory heap.

Parameters		
Parameters	Type	Where Typedef Declared
terrain x size	int	Standard
terrain y size	int	Standard
Calls		
Function	Where Described	
TABLE_SIZE_FUNCTION	Sec. 2.9.3.2 See Appendix A	
heap_allocate	Sec. 2.14.2.1.1	

Table 2.9-49: init\_grid\_tables CSU [8.9.3.1.10]

## 2.9.3.1.11 init\_grid\_entry\_list CSU

For each grid table in the grid entry list, this CSU updates the vehicle and the grid, and determines if the table applies to the function. If the table does apply to the function, insert\_grid\_entry is called, setting the previous and next entries in that table's GRID\_ENTRY\_LIST to NULL.

Parameters		
Parameters	Type	Where Typedef Declared
gel	GRID_ENTRY_LIST	Sec. 2.9.3.2
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
TABLE_APPLIES_TO_FUNCTION	Sec. 2.9.3.2 See Appendix A	
insert_grid_entry	Sec. 2.9.3.1.15	

Table 2.9-50: init\_grid\_entry\_list CSU [8.9.3.1.11]

## 2.9.3.1.12 update\_grid\_entry\_list CSU

This CSU updates grid entries on the GRID\_ENTRY\_LIST passed based on x,y coordinates.

Parameters		
Parameters	Type	Where Typedef Declared
gel	GRID_ENTRY_LIST	Sec. 2.9.3.2
x	int	Standard
y	int	Standard
Calls		
Function	Where Described	
coords_within_database	Sec. 2.13.3.1	
remove_grid_entry	Sec. 2.9.3.1.14	
insert_grid_entry	Sec. 2.9.3.1.15	

Table 2.9-51: update\_grade\_entry\_list CSU [8.9.3.1.12]

**2.9.3.1.13 destroy\_grid\_entry\_list CSU**

This CSU destroys the grid entry list passed, through calls to remove\_grid\_entry.

Parameters		
Parameters	Type	Where Typedef Declared
gel	GRID_ENTRY_LIST	Sec. 2.9.3.2
Calls		
Function	Where Described	
remove_grid_entry()	Sec. 2.9.3.1.14	

**Table 2.9-52: destroy\_grid\_entry\_list CSU [8.9.3.1.13]**

**2.9.3.1.14 remove\_grid\_entry CSU**

This CSU removes the grid entry passed from its grid entry list.

Parameters		
Parameters	Type	Where Typedef Declared
table	unsigned short	Standard
ge	pointer to GRID_ENTRY	Sec. 2.9.3.2

**Table 2.9-53: remove\_grid\_entry CSU [8.9.3.1.14]**

**2.9.3.1.15 insert\_grid\_entry CSU**

This CSU inserts the grid entry passed into its grid entry list.

Parameters		
Parameters	Type	Where Typedef Declared
table	unsigned short	Standard
grid	unsigned int	Standard
ge	pointer to GRID_ENTRY	Sec. 2.9.3.2

**Table 2.9-54: insert\_grid\_entry CSU [8.9.3.1.15]**

**2.9.3.2 iterator.h CSU**

/simnet/src/host/iterator.h

This CSU contains macros used in the iterator code as well as some binary templates used for comparisons. Constant and structure definitions within the header follow; macros are defined in Appendix A.

Constant	Value
LOCAL_VEHICLE	0x01
COMPOSITE	0x02
STEALTHY_LOCAL_VEHICLE	0x04
REMOTE_VEHICLE	0x08
MISSILE	0x10
INACTIVE_REMOTE_VEHICLE	0x20
VEHICLES	0x09
LOCALS	0x17
COMMANDABLES	0x07
ALL_OBJECTS	0xFF

Table 2.9-55: iterator.h Object Constant Definitions

Item	Type	Where Type Defined
next	unsigned short	Standard
match_type	unsigned short	Standard

Table 2.9-56: VEHICLE\_ITERATOR Structure Definition

The following typedef struct is tagged GRID\_ENTRY.

Item	Type	Where Type Defined
next	pointer to struct grid_entry	Sec. 2.9.3.2
prev	pointer to struct grid_entry	Sec. 2.9.3.2
vehicle	pointer to struct saf_object	Sec. 2.9.3.2
applies to : 1	unsigned int	Standard
grid	int	Standard

Table 2.9-57: GRID\_ENTRY Structure Definition

Constant	Value
NUM_GRID_TABLES	3
TABLE_200	0
TABLE_DIST_3500	1
TABLE_OTHER_3500	2

Table 2.9-58: Iterator.h Table Constant Definitions

Constant	Value
GRID_OFF_TDB	0xFFFFFFFF

Table 2.9-59: GRID\_OFF\_TDB Constant Definition

In addition, iterator.h also contains the following type definition:

```
typedef GRID_ENTRY GRID_ENTRY_LIST[NUM_GRID_TABLES]
```

and, among others, the following extern definition:

```
extern GRID_ENTRY ** grid_tables[ ]
```

They are required for the final two macros, `DECLARE_FOR_VEHICLES_DO_VARS` and `FOR_VEHICLES_WITHIN_N_GRID_DO`, which are defined in Appendix A.

## 2.10 OPORDERS CSC

The OPORDERS CSC [8.10] contains the data structures for the representation of graphical operations orders that are received from the workstation and the Combat Instruction Sets (CIS), which represent the behaviors a unit can simulate. The graphical operations orders are composed of routes and control measures to which CISs can be associated. This CSC also contains CSUs for determining when the unit reaches a control measure, and also for following routes.

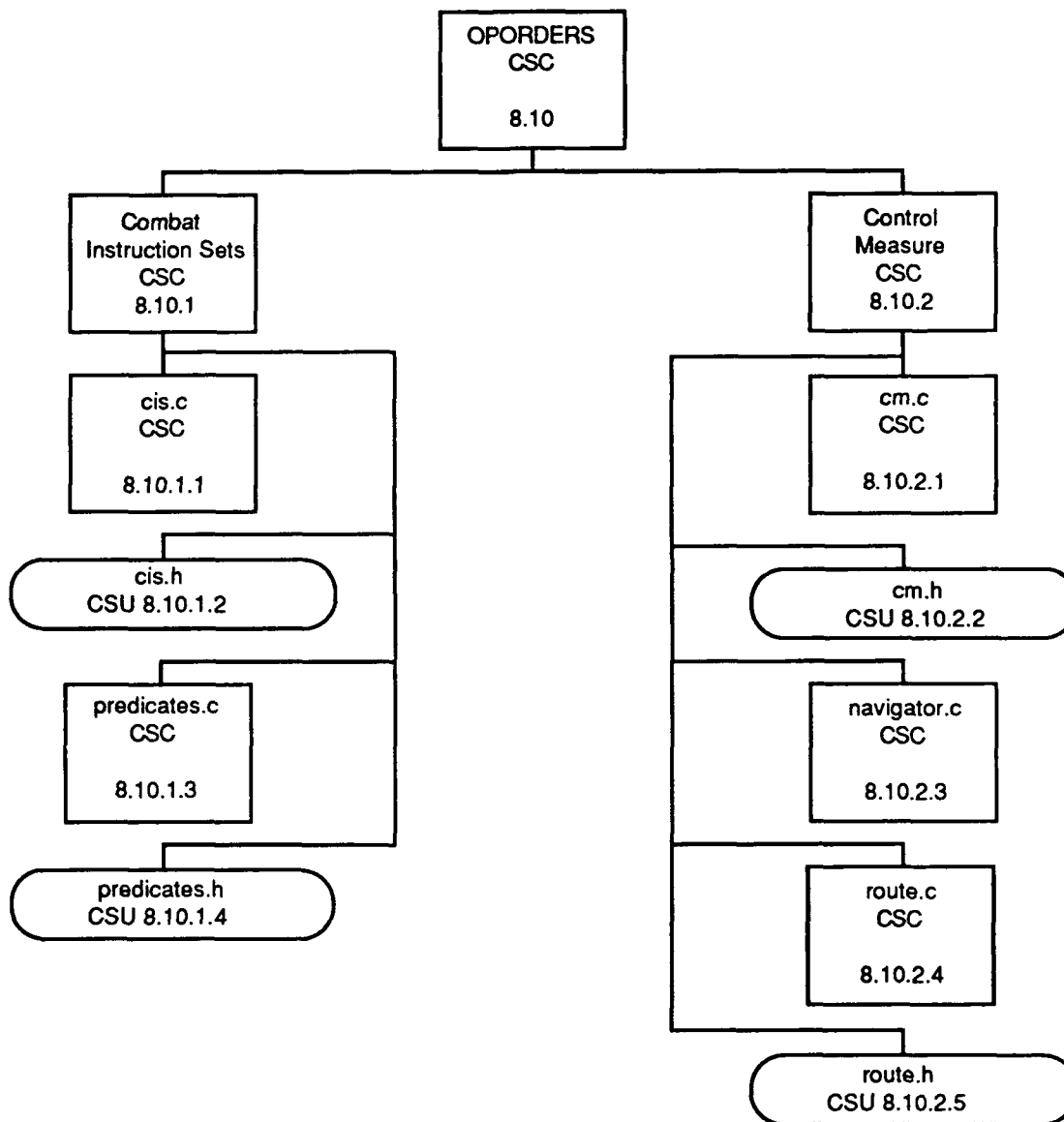


Figure 2.10-1: OPORDERS CSC Structure

### 2.10.1 Combat Instruction Sets CSC

The Combat Instruction Sets CSC [8.10.1] consists of four files: two CSCs, `cis.c` [8.10.1.1] and `predicates.c` [8.10.1.3], and their header file CSUs, `cis.h` [8.10.1.2] and `predicates.h` [8.10.1.4]. The `cis.c` file handles the reaction choices for a unit, while `predicates.c` tests whether a combat instruction set is needed to control the actions of an involved unit.

#### 2.10.1.1 `cis.c` CSC

`/simnet/src/host/cis.c`

The combat instruction sets are the reaction choices available for a unit reacting to a control measure. They are loaded from a data file (see data files) and handled in the `cis.c` CSC.

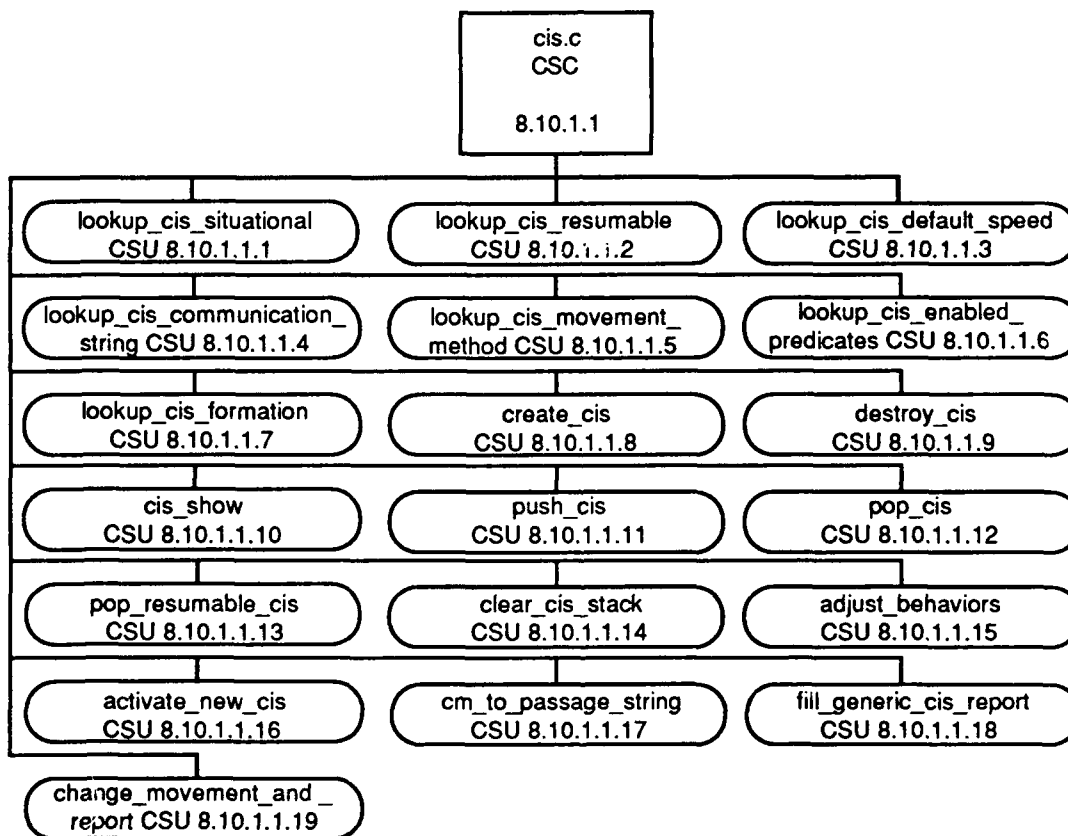


Figure 2.10-2: `cis.c` CSC Structure

**2.10.1.1.1 lookup\_cis\_situational CSU**

This CIS determines if a particular CIS is a situational CIS, and returns TRUE if it is.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
cis_name	pointer to char	Standard
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Found
FALSE	int	Not found
Calls		
Function	Where Described	
ft_table	Sec. 2.14.1.2.14	
ft_int	Sec. 2.14.1.2.11	

Table 2.10-1: lookup\_cis\_situational CSU [8.10.1.1.1]

**2.10.1.1.2 lookup\_cis\_resumable CSU**

This CIS determines if a particular CIS is resumable, and returns TRUE if it is.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
cis_name	pointer to char	Standard
ReturnValues		
Return Value	Type	Meaning
TRUE	int	CIS resumable.
FALSE	int	CIS not resumable.
Calls		
Function	Where Described	
ft_table	Sec. 2.14.1.2.14	
ft_int	Sec. 2.14.1.2.11	

Table 2.10-2: lookup\_cis\_resumable CSU [8.10.1.1.2]



**2.10.1.1.3 lookup\_cis\_default\_speed CSU**

This CSU returns the default speed of a particular CIS.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
cis_name	pointer to char	Standard
ReturnValues		
Return Value	Type	Meaning
kph to mps(...)	REAL	Speed determined.
Calls		
Function	Where Described	
ft table	Sec. 2.14.1.2.14	
kph to mps	Sec. 2.13.3.1	
ft int	Sec. 2.14.1.2.11	

**Table 2.10-3: lookup\_cis\_default\_speed CSU [8.10.1.1.3]**

**2.10.1.1.4 lookup\_cis\_communication\_string CSU**

This CSU returns the string that should be sent to the workstation when a particular CIS is executed.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
cis_name	pointer to char	Standard
ReturnValues		
Return Value	Type	Meaning
ft_symbol(...)	pointer to char	Normal end.
NULL	pointer to char	No CIS entry.
Calls		
Function	Where Described	
ft table	Sec. 2.14.1.2.14	
ft_symbol	Sec. 2.14.1.2.13	

**Table 2.10-4: lookup\_cis\_communication\_string CSU [8.10.1.1.4]**

**2.10.1.1.5 lookup\_cis\_movement\_method CSU**

This CSU returns the appropriate movement method for a particular CIS.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
cis_name	pointer to char	Standard
ReturnValues		
Return Value	Type	Meaning
ft_symbol(...)	pointer to char	Normal end.
NULL	pointer to char	No CIS entry.
Calls		
Function	Where Described	
ft_table	Sec. 2.14.1.2.14	
ft_symbol	Sec. 2.14.1.2.13	

**Table 2.10-5: lookup\_cis\_movement\_method CSU [8.10.1.1.5]**

**2.10.1.1.6 lookup\_cis\_enabled\_predicates CSU**

This CSU returns the enabled predicates associated with a particular CIS.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
cis_name	pointer to char	Standard
ReturnValues		
Return Value	Type	Meaning
ft_symbol(...)	pointer to char	Normal end.
NULL	pointer to char	No CIS entry.
Calls		
Function	Where Described	
ft_table	Sec. 2.14.1.2.14	

**Table 2.10-6: lookup\_cis\_enabled\_predicates CSU [8.10.1.1.6]**

**2.10.1.1.7 lookup\_cis\_formation CSU**

This CSU returns the appropriate formation associated with a particular CIS.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
cis_name	pointer to char	Standard

ReturnValues		
Return Value	Type	Meaning
ft_symbol(...)	pointer to char	Normal end.
UNKNOWN_SYM	pointer to char	No CIS entry.
Calls		
Function	Where Described	
ft_table	Sec. 2.14.1.2.14	
ft_symbol	Sec. 2.14.1.2.13	

Table 2.10-7: lookup\_cis\_formation CSU [8.10.1.1.7]

## 2.10.1.1.8 create\_cis CSU

This CSU allocates memory for a CIS structure, sets the name to the one passed, sets stacked\_cis to NULL, and returns a pointer to the set.

Parameters		
Parameters	Type	Where Typedef Declared
name	pointer to char	Standard
ReturnValues		
Return Value	Type	Meaning
set	pointer to CIS	Created CIS.
Calls		
Function	Where Described	
allocate_cis	Sec. 2.10.1.2 See Appendix A	

Table 2.10-8: create\_cis CSU [8.10.1.1.8]

## 2.10.1.1.9 destroy\_cis CSU

This CSU deallocates the CIS memory.

Parameters		
Parameters	Type	Where Typedef Declared
set	pointer to CIS	Sec. 2.10.1.2
Calls		
Function	Where Described	
deallocate_cis	Sec. 2.10.1.2 See Appendix A	

Table 2.10-9: destroy\_cis CSU [8.10.1.1.9]

**2.10.1.1.10 cis\_show CSU**

This CSU displays all of the CISs on the stack, beginning with the current one.

Parameters		
Parameters	Type	Where Typedef Declared
set	pointer to CIS	Sec. 2.10.1.2

**Table 2.10-10: cis\_show CSU [8.10.1.1.10]**

**2.10.1.1.11 push\_cis CSU**

This CSU pushes a new CIS onto the stack of a composite SAF object.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
set	pointer to CIS	Sec. 2.10.1.2
speed	REAL	sim_types.h
report	int	Standard
cm	pointer to CONTROL MEASURE	Sec. 2.10.2.2
Calls		
Function	Where Described	
adjust behaviors	Sec. 2.10.1.1.15	

**Table 2.10-11: push\_cis CSU [8.10.1.1.11]**

**2.10.1.1.12 pop\_cis CSU**

This CSU pops the CIS off the top of the CIS stack of a composite SAF object.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Errors		
Error Name	Reason for Error	
Error. ... cannot pop empty cis stack	Unable to set old_set equal to composite->combat_instruction_set.	
Calls		
Function	Where Described	
OBJ_VEHICLEID	Sec. 2.9.1.1 See Appendix A	
adjust behaviors	Sec. 2.10.1.1.15	
destroy cis	Sec. 2.10.1.1.9	

**Table 2.10-12: pop\_cis CSU [8.10.1.1.12]**

**2.10.1.1.13 pop\_resumable\_cis CSU**

This CSU pops CISs off the top of the CIS stack until a CIS that is not resumable is found, or until the stack is empty.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
lookup_cis resumable	Sec. 2.10.1.1.2	
destroy_cis	Sec. 2.10.1.1.9	
adjust_behaviors	Sec. 2.10.1.1.15	

**Table 2.10-13: pop\_resumable\_cis CSU [8.10.1.1.13]**

**2.10.1.1.14 clear\_cis\_stack CSU**

This CSU, for each of the CISs on the stack, calls destroy\_cis to deallocate the set's memory. It then sets the composite's combat instruction set element to NULL.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
destroy_cis	Sec. 2.10.1.1.9	

**Table 2.10-14: clear\_cis\_stack CSU [8.10.1.1.14]**

**2.10.1.1.15 adjust\_behaviors CSU**

This CSU makes the changes to a SAF composite object based on the behaviors associated with the CIS input.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
set	pointer to CIS	Sec. 2.10.1.2
speed	REAL	sim_types.h
report	int	Standard
cm	pointer to CONTROL_MEASURE	Sec. 2.10.2.2

Calls	
Function	Where Described
commander_set_mission_speed	Sec. 2.8.1.1.12
lookup_cis_information	Sec. 2.10.1.1.7
symbols_match	Sec. 2.1.1.5 See Appendix A
commander_set_mission_formation	Sec. 2.8.1.1.15
change_movement_and_report	Sec. 2.10.1.1.19
lookup_cis_movement_method	Sec. 2.10.1.1.5
lookup_cis_enabled_predicates	Sec. 2.10.1.1.6
reset_predicates	Sec. 2.10.1.3.10
enable_predicates	Sec. 2.10.1.3.12

Table 2.10-15: adjust\_behaviors CSU [8.10.1.1.15]

#### 2.10.1.1.16 activate\_new\_cis CSU

This CSU starts the execution of a CIS.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
cis_name	pointer to char	Standard
new_speed	REAL	sim_types.h
report	int	Standard
cm	pointer to CONTROL_MEASURE	Sec. 2.10.2.2

Calls	
Function	Where Described
buffer_allocate	Sec. 2.14.4.2.12
fill_generic_cis_report	Sec. 2.10.1.1.18
sbx_connection_send_to_port	Sec. 2.4.3.2.19
buffer_deallocate	Sec. 2.14.4.2.15
create_cis	Sec. 2.10.1.1.8
lookup_cis_resumable	Sec. 2.10.1.1.2
destroy_cis	Sec. 2.10.1.1.9
push_cis	Sec. 2.10.1.1.11

Table 2.10-16: activate\_new\_cis CSU [8.10.1.1.16]

**2.10.1.1.17 cm\_to\_passage\_string CSU**

This CSU returns, via a switch for the CM\_TYPE\_ token passed, a character string defining passage.

Parameters		
Parameters	Type	Where Typedef Declared
cm	pointer to CONTROL_MEASURE	Sec. 2.10.2.2
ReturnValues		
Return Value	Type	Meaning
"Passed"	pointer to char	CM_TYPE_POINT
"Crossed"	pointer to char	CM_TYPE_LINE
"Entered"	pointer to char	CM_TYPE_AREA or CM_TYPE_ZONE
"At"	pointer to char	Default, none of the above

**Table 2.10-17: cm\_to\_passage\_string CSU [8.10.1.1.17]**

**2.10.1.1.18 fill\_generic\_cis\_report CSU**

This CSU fills the appropriate information from a CIS into a CIS report, which is sent to the workstation.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
msg	pointer to GENERIC_MESSAGE_MSG	Sec. 2.4.1.1
ptr	pointer to char	Standard
cm	pointer to CONTROL_MEASURE	Sec. 2.10.2.2
set	pointer to CIS	Sec. 2.10.1.2
speed_change	int	Standard
formation_change	int	Standard
Calls		
Function	Where Described	
fill_sbx_opfor_header	Sec. 2.4.3.2.18	
OBJ_VEHICLEID	Sec. 2.9.1.1 See Appendix A	
OBJ_POSITION	Sec. 2.9.1.1 See Appendix A	
tdb_giv_xy_get_utm	Sec. 2.21.7.24.3	
cm_to_passage_string	Sec. 2.10.1.1.17	
lookup_cis_communication_string	Sec. 2.10.1.1.4	

**Table 2.10-18: fill\_generic\_cis\_report CSU [8.10.1.1.18]**

**2.10.1.1.19 change\_movement\_and\_report CSU**

This CSU changes the movement method of a SAF composite object and sends a message to the workstation about the change.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
method	pointer to char	Standard
cm	pointer to CONTROL_MEASURE	Sec. 2.10.2.2
report	int	Standard
set	pointer to CIS	Sec. 2.10.1.2
speed_change	int	Standard
formation_change	int	Standard
Calls		
Function	Where Described	
buffer_allocate	Sec. 2.14.4.2.12	
fill_generic_cis_report	Sec. 2.10.1.1.18	
symbols_match	Sec. 2.1.1.5 See Appendix A	
commander_set_mission_direction	Sec. 2.8.1.1.12	
cm_get_center_of_mass	Sec. 2.10.2.3.15	
tdb_giv_xy_get_utm	Sec. 2.21.7.24.3	
commander_goto_point	Sec. 2.8.1.1.19	
commander_halt	Sec. 2.8.1.1.11	
intervis_get_high_ground	Sec. 2.6.5.2.5	
OBJ_POSITION	Sec. 2.9.1.1 See Appendix A	
lookup_cis_situational	Sec. 2.10.1.1.1	
sbx_connection_send_to_port	Sec. 2.4.3.2.19	
buffer_deallocate	Sec. 2.14.4.2.15	

**Table 2.10-19: change\_movement\_and\_report CSU [8.10.1.1.19]**

**2.10.1.2 cis.h CSU**

/simnet/src/host/cis.h

This file contains the macro definitions (defined in Appendix A), structure definition (CIS), and symbolic constants needed by the combat instruction set code.

The following typedef struct is tagged cis.

Item	Type	Where Type Defined
stacked_cis	pointer to struct cis	This struct
name	pointer to char	Standard

**Table 2.10-20: CIS Structure Definition**



Constant	Value
ENTERING CIS	0
POPPING CIS	1

Table 2.10-21: cis.h Constant Definitions

### 2.10.1.3 predicates.c CSC

/simnet/src/host/predicates.c

This CSC contains code to test whether certain combat instruction sets are needed to control the actions of the involved units.

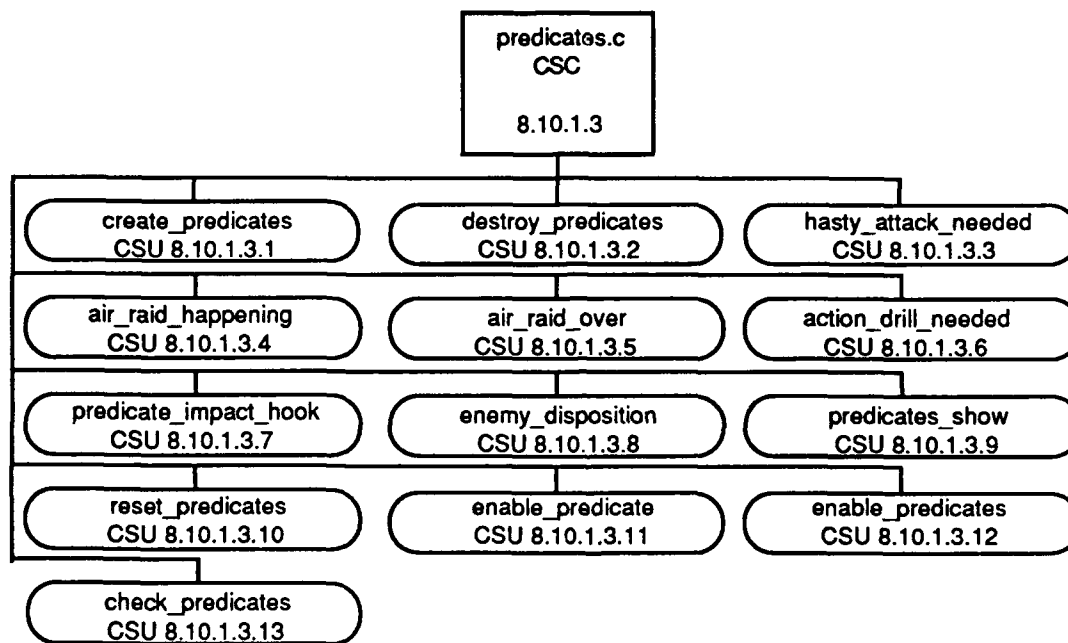


Figure 2.10-3: predicates.c CSC Structure

#### 2.10.1.3.1 create\_predicates CSU

This CSU allocates memory for a PREDICATES structure and then calls CSU reset\_predicates to initialize elements to FALSE.

ReturnValues		
Return Value	Type	Meaning
result	pointer to PREDICATES	Created predicates.
Calls		
Function	Where Described	
allocate predicates	Sec. 2.10.1.4 See Appendix A	
reset predicates	Sec. 2.10.1.3.10	

Table 2.10-22: create\_predicates CSU [8.10.1.3.1]

**2.10.1.3.2 destroy\_predicates CSU**

This CSU deallocates the PREDICATES structure memory through the CSU deallocate\_predicate.

Parameters		
Parameters	Type	Where Typedef Declared
p	pointer to PREDICATES	Sec. 2.10.1.4
Calls		
Function	Where Described	
deallocate_predicates	Sec. 2.10.1.4 See Appendix A	

**Table 2.10-23: destroy\_predicates CSU [8.10.1.3.2]**

**2.10.1.3.3 hasty\_attack\_needed CSU**

This CSU checks if there has been a round hit, and if the time since that hit is less than the HASTY\_ATTACK\_ROUND\_TIME\_THRESHOLD time. The CSU then calls cluster\_from\_vehicle to get the cluster. If the number of cluster vehicles is greater than or equal to the HASTY\_ATTACK\_VEHICLE\_THRESHOLD and the position is within the HASTY\_ATTACK\_RANGE2\_THRESHOLD, and the enemy disposition is one of the recognized cases, the predicates attacking force is set to the cluster and TRUE is returned; otherwise, the predicates attacking force is set to NULL and FALSE is returned.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Hasty attack needed.
FALSE	int	Hasty attack not needed.
Calls		
Function	Where Described	
OBJ POSITION	Sec. 2.9.1.1 See Appendix A	
cluster from vehicle	Sec. 2.8.2.1.25	
vec2 range squared	Sec. 2.14.3.5.30	
enemy disposition	Sec. 2.10.1.3.8	

**Table 2.10-24: hasty\_attack\_needed CSU [8.10.1.3.3]**

**2.10.1.3.4 air\_raid\_happening CSU**

This CSU determines if an air hit was previous experienced, and if the time since the experience is less than the AIR\_RAID\_INTERVAL time. If so, it returns TRUE indictating that an air raid is happening; otherwise, it returns FALSE.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Air raid happening.
FALSE	int	Air raid not happening.

**Table 2.10-25: air\_raid\_happening CSU [8.10.1.3.4]**

**2.10.1.3.5 air\_raid\_over CSU**

This CSU determines if the time since an air hit was experienced is greater than the AIR\_RAID\_INTERVAL time. If so, it returns TRUE indicating that the air raid is over; otherwise, it returns FALSE.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Air raid is over.
FALSE	int	Air raid is not over.

**Table 2.10-26: air\_raid\_over CSU [8.10.1.3.5]**

**2.10.1.3.6 action\_drill\_needed CSU**

This CSU determines whether a SAF platoon should initiate an action drill by determining if the enemy is closing in or flanking.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Action drill needed.
FALSE	int	Action drill not needed.

Calls	
Function	Where Described
OBJ POSITION	Sec. 2.9.1.1 See Appendix A
cluster from vehicle	Sec. 2.8.2.1.25
vec2_range_squared	Sec. 2.14.3.5.30
enemy_disposition	Sec. 2.10.1.3.8

Table 2.10-27: action\_drill\_needed CSU [8.10.1.3.6]

## 2.10.1.3.7 predicate\_impact\_hook CSU

This CSU communicates under-attack information to a SAF vehicle's superior.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
attackerID	unsigned int	Standard
Calls		
Function	Where Described	
LOOKUP_SAF_OBJ	Sec. 2.9.1.1 See Appendix A	
IS_AIRCRAFT		
OBJ_OBJECT_TYPE	Sec. 2.9.1.1 See Appendix A	

Table 2.10-28: predicate\_impact\_hook CSU [8.10.1.3.7]

## 2.10.1.3.8 enemy\_disposition CSU

This CSU calculates whether enemy vehicles are closing in or flanking on a SAF object.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
cluster	pointer to VEH_CLUSTER	Sec. 2.8.2.2
ReturnValues		
Return Value	Type	Meaning
ENEMY_AT_FLANK_OR_REAR_STATIONARY	int	Enemy is at flank or rear and is not moving.
ENEMY_AT_FLANK_OR_REAR_RETREATING	int	Enemy is at flank or rear and is retreating.
ENEMY_AT_FLANK_OR_REAR_CLOSING_IN	int	Enemy is at flank or rear and is approaching.
ENEMY_AT_FRONT_STATIONARY	int	Enemy is at front and not moving.
ENEMY_AT_FRONT_CLOSING_IN	int	Enemy is at front and approaching.
ENEMY_AT_FRONT_RETREATING	int	Enemy is at front and is retreating.
ENEMY_AT_UNKNOWN	int	There is no SAF vehicle.

Calls	
Function	Where Described
composite_distinguished_member	Sec. 2.8.1.3.16
OBJ_POSITION	Sec. 2.9.1.1 See Appendix A
vec_copy	Sec. 2.6.2.53.1 Vehicles CSCI SDD
OBJ_DIRECTION	Sec. 2.9.1.1 See Appendix A
vec2_norm	Sec. 2.14.3.5.31
vec_sub	Sec. 2.6.2.65.1 Vehicles CSCI SDD
vec2_world2veh	Sec. 2.6.3.2.38
abs	Sec. 2.6.7.3 & Sec. 2.13.3.2 See Appendix A
vec2_dot	Sec. 2.14.3.5.24

Table 2.10-29: enemy\_disposition CSU [8.10.1.3.8]

## 2.10.1.3.9 predicates\_show CSU

This CSU displays predicates requirements and the last air hit, last round hit, and last round attacker.

Parameters		
Parameters	Type	Where Typedef Declared
predicates	pointer to PREDICATES	Sec. 2.10.1.4

Table 2.10-30: predicates\_show CSU [8.10.1.3.9]

## 2.10.1.3.10 reset\_predicates CSU

This CSU resets the values in an enabled predicates to FALSE.

Parameters		
Parameters	Type	Where Typedef Declared
predicates	pointer to PREDICATES	Sec. 2.10.1.4

Table 2.10-31: reset\_predicates CSU [8.10.1.3.10]

## 2.10.1.3.11 enable\_predicate CSU

This CSU, depending on the predicate passed, will reset the appropriate predicates variables and set the predicates event to TRUE; however, if the predicate is unknown, a message will be displayed that the SAF object (giving vehicle id number) is trying to enable an unknown predicate.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF OBJECT	Sec. 2.9.1.1
predicate	pointer to char	Standard

Calls	
Function	Where Described
symbols match	Sec. 2.1.1.5 See Appendix A
OBJ VEHICLEID	Sec. 2.9.1.1 See Appendix A

Table 2.10-32: enable\_predicate CSU [8.10.1.3.11]

## 2.10.1.3.12 enable\_predicates CSU

This CSU calls enable\_predicate for each of a number of predicates.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
predicates	pointer to DATA_UNION	Sec. 2.1.1.5
Calls		
Function	Where Described	
enable_predicate	Sec. 2.10.1.3.11	

Table 2.10-33: enable\_predicates CSU [8.10.1.3.12]

## 2.10.1.3.13 check\_predicates CSU

This CSU checks the predicates, and either creates, sets the speed for, and pushes a CIS onto the stack, or removes one.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
hasty attack needed	Sec. 2.10.1.3.3	
push cis	Sec. 2.10.1.1.11	
create cis	Sec. 2.10.1.1.8	
lookup cis default speed	Sec. 2.10.1.1.3	
air raid happening	Sec. 2.10.1.3.4	
air raid over	Sec. 2.10.1.3.5	
pop cis	Sec. 2.10.1.1.12	
action drill needed	Sec. 2.10.1.3.6	

Table 2.10-34: check\_predicates CSU [8.10.1.3.13]

**2.10.1.4 predicates.h CSU**

/simnet/src/host/predicates.h

This CSU contains the structure definition, macro definitions (defined in Appendix A) and symbolic constants used by the predicate code. These constants specify threshold requirements used when performing the tests in predicates.c.

The following typedef struct is tagged predicates. The first four items are predicate flags and the last four items are data needed to support the predicates.

Item	Type	Where Type Defined
hasty_attack_needed : 1	unsigned int	Standard
air_raid_happening : 1	unsigned int	Standard
air_raid_over : 1	unsigned int	Standard
action_drill_needed : 1	unsigned int	Standard
last_air_hit	unsigned int	Standard
last_round_hit	unsigned int	Standard
last_round_attacker	unsigned int	Standard
attacking_force	pointer to VEH_CLUSTER	Sec. 2.8.2.2

**Table 2.10-35: PREDICATES Structure Definition**

Constant	Value
MOVING_IN_THRESHOLD2	(51.0 * 51.0)
AIR_RAID_INTERVAL	(3 * 60 * 1000)
HASTY_ATTACK_ROUND_TIME_THRESHOLD	(3 * 60 * 1000)
HASTY_ATTACK_VEHICLE_THRESHOLD	3
HASTY_ATTACK_RANGE2_THRESHOLD	(2000.0 * 2000.0)
ACTION_DRILL_ROUND_TIME_THRESHOLD	(3 * 60 * 1000)
ACTION_DRILL_VEHICLE_THRESHOLD	2
ACTION_DRILL_RANGE2_THRESHOLD	(2000.0 * 2000.0)
ENEMY_AT_FLANK_OR_REAR_STATIONARY	0
ENEMY_AT_FLANK_OR_REAR_RETREATING	1
ENEMY_AT_FLANK_OR_REAR_CLOSING_IN	2
ENEMY_AT_FRONT_STATIONARY	3
ENEMY_AT_FRONT_RETREATING	4
ENEMY_AT_FRONT_CLOSING_IN	5
ENEMY_AT_UNKNOWN	6

**Table 2.10-36: predicates.h Constant Definitions**

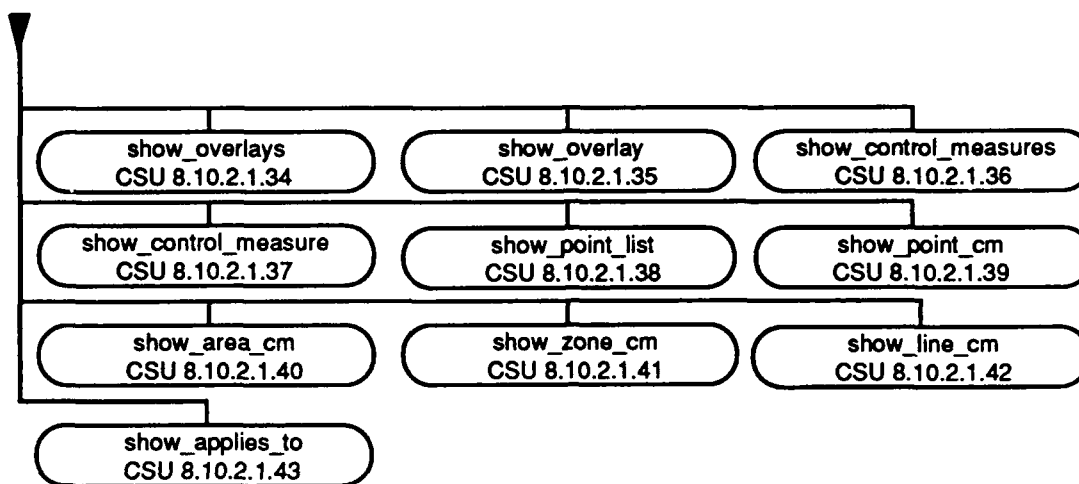


Figure 2.10-5: cm.c CSC Structure Part 2 of 2

#### 2.10.2.1.1 copy\_float\_point\_list\_to\_real\_point\_list CSU

This CSU copies a floating point list of points into a real point list.

Parameters		
Parameters	Type	Where Typedef Declared
float_point_list	pointer to FLOAT_CM_POINT_LIST	Sec. 2.10.2.2
real_point_list	pointer to CM_POINT_LIST	Sec. 2.10.2.2

Table 2.10-37: copy\_float\_point\_list\_to\_real\_point\_list CSU [8.10.2.1.1]

#### 2.10.2.1.2 get\_overlay CSU

This CSU obtains an overlay from the SBX, creating it if necessary by allocating memory, initializing values, making the associated list item, splicing it into the front of the existing list, and returning the new overlay.

Parameters		
Parameters	Type	Where Typedef Declared
overlay_id	int	standard
overlay_name	pointer to char	standard
sbx_connection	pointer to SBX_CONNECTION vars	Sec. 2.4.3.3
ReturnValues		
Return Value	Type	Meaning
overlay	pointer to OVERLAY	Overlay fetched or created



## 2.10.2 Control Measure CSC

### 2.10.2.1 cm.c CSC

/simnet/src/host/cm.c

This CSC takes the control measure information passed from the workstation and converts it into a form usable by the simulation host for the composites and vehicles it is simulating.

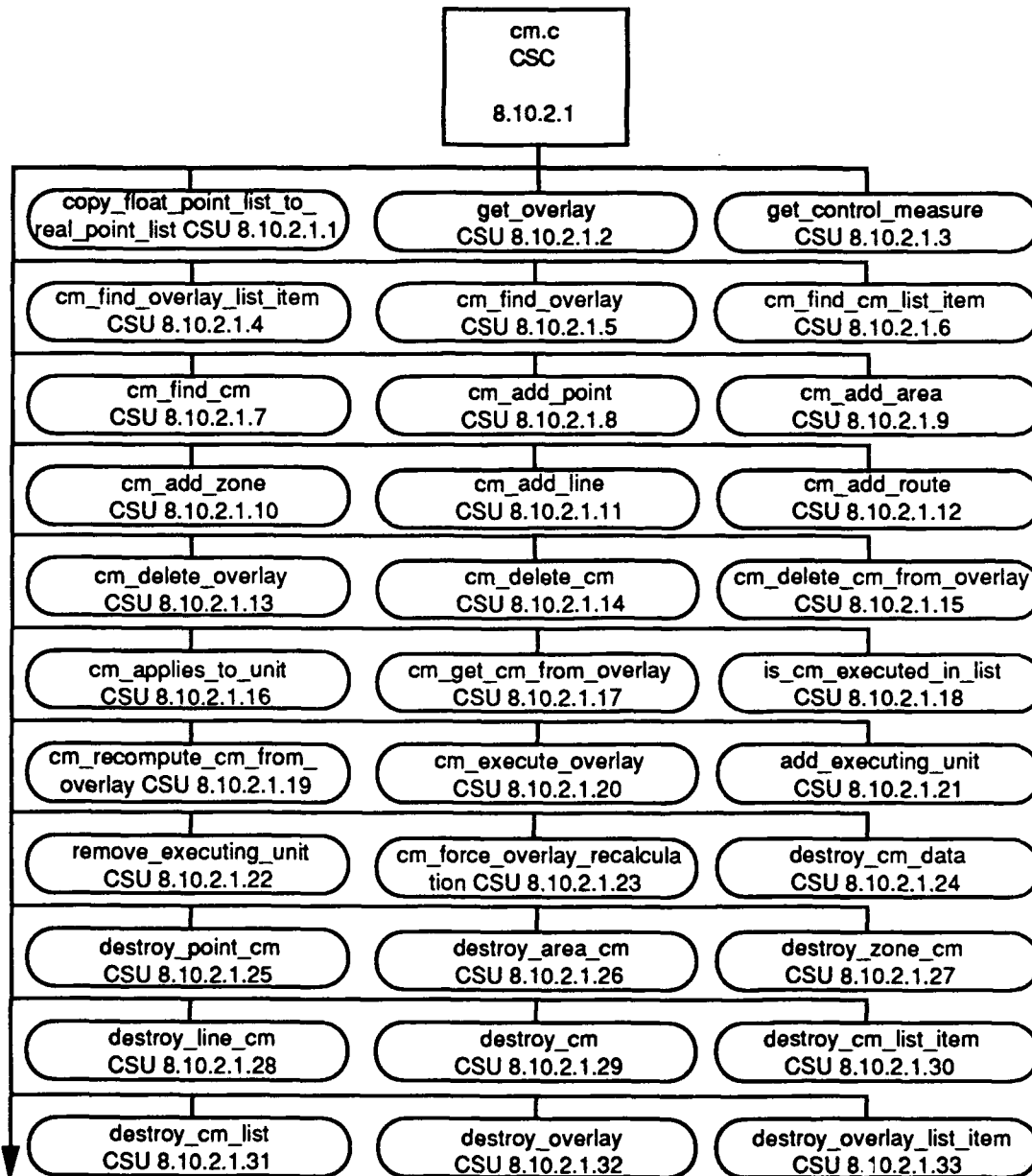


Figure 2.10-4: cm.c CSC Structure Part 1 of 2

Calls	
Function	Where Described
DEBUG CM	Sec. 2.5.2.2
allocate overlay	Sec. 2.10.2.2
allocate overlay_list item	Sec. 2.10.2.2

Table 2.10-38: get\_overlay CSU [8.10.2.1.2]

## 2.10.2.1.3 get\_control\_measure CSU

This CSU obtains a control measure from an overlay. If the control measure does not exist, the CSU creates it and its data based upon type.

Parameters		
Parameters	Type	Where Typedef Declared
id	int	Standard
name	pointer to char	Standard
type	int	Standard
overlay	pointer to OVERLAY	Sec. 2.10.2.2
num_units	short	Standard
applies_to[ ]	short	Standard
ReturnValues		
Return Value	Type	Meaning
NULL	int	Not created
cm	int	The new control measure
Calls		
Function	Where Described	
DEBUG CM	Sec. 2.5.2.2	
allocate control measure	Sec. 2.10.2.2	
allocate_point_cm	Sec. 2.10.2.2	
allocate_area_cm	Sec. 2.10.2.	
allocate_zone_cm	Sec. 2.10.2.2	
allocate_line_cm	Sec. 2.10.2.2	
allocate_control_measure_list_item	Sec. 2.10.2.2	

Table 2.10-39: get\_control\_measure CSU [8.10.2.1.3]

## 2.10.2.1.4 cm\_find\_overlay\_list\_item CSU

This CSU finds an overlay list item (id) if it is in the overlay lists.

Parameters		
Parameters	Type	Where Typedef Declared
sbx	pointer to SBX_CONNECTION_VARS	Sec. 2.4.3.3
overlay_id	int	Standard

ReturnValues		
Return Value	Type	Meaning
overlay_list	pointer to OVERLAY_LIST	Pointer to list
NULL	pointer to OVERLAY_LIST	Not found

Table 2.10-40: cm\_find\_overlay\_list\_item CSU [8.10.2.1.4]

## 2.10.2.1.5 cm\_find\_overlay CSU

This CSU finds an overlay through a call to cm\_find\_overlay\_list\_item returning a pointer to the overlay if one exists.

Parameters		
Parameters	Type	Where Typedef Declared
sbx	pointer to SBX_CONNECTION_VARS	Sec. 2.4.3.3
overlay_id	int	Standard
ReturnValues		
Return Value	Type	Meaning
result->overlay	pointer to OVERLAY	Overlay found
NULL	pointer to OVERLAY	Overlay not there
Calls		
Function	Where Described	
cm_find_overlay_list_item	Sec. 2.10.2.1.6	

Table 2.10-41: cm\_find\_overlay CSU [8.10.2.1.5]

## 2.10.2.1.6 cm\_find\_cm\_list\_item CSU

This CSU finds a control measure list if it exists.

Parameters		
Parameters	Type	Where Typedef Declared
overlay	pointer to OVERLAY	Sec. 2.10.2.2
cm_id	int	Standard
ReturnValues		
Return Value	Type	Meaning
cm_list	pointer to COUNTER_MEASURE_LIST	List found
NULL	pointer to COUNTER_MEASURE_LIST	Not there

Table 2.10-42: cm\_find\_cm\_list\_item CSU [8.10.2.1.6]

**2.10.2.1.7 cm\_find\_cm CSU**

This CSU finds a control measure, returning a pointer to it, if one exists.

Parameters		
Parameters	Type	Where Typedef Declared
overlay	pointer to OVERLAY	Sec. 2.10.2.2
cm id	int	Standard
ReturnValues		
Return Value	Type	Meaning
result->cm	pointer to CONTROL MEASURE LIST	This is the control measure
NULL	pointer to CONTROL MEASURE LIST	Not there
Calls		
Function	Where Described	
cm find cm list item	Sec. 2.10.2.1.6	

Table 2.10-43: cm\_find\_cm CSU [8.10.2.1.7]

**2.10.2.1.8 cm\_add\_point CSU**

This CSU adds a point control measure from the SBX connection to an overlay.

Parameters		
Parameters	Type	Where Typedef Declared
sbx_connection	pointer to SBX CONNECTION VARS	Sec. 2.4.3.3
msg_ptr	pointer to POINT MSG	Sec. 2.4.1.1
Calls		
Function	Where Described	
get_overlay	Sec. 2.10.2.1.2	
get_control_measure	Sec. 2.10.2.1.3	
DEBUG_CM	Sec. 2.10.2.2	
get_symbol	Sec. 2.1.1.3.2	
cm_force_overlay_recalculation	Sec. 2.10.2.1.23	

Table 2.10-44: cm\_add\_point CSU [8.10.2.1.8]

**2.10.2.1.9 cm\_add\_area CSU**

This CSU adds an area control measure from the SBX connection to an overlay.

Parameters		
Parameters	Type	Where Typedef Declared
sbx_connection	pointer to SBX CONNECTION_VARS	Sec. 2.4.3.3
msg_ptr	pointer to AREA_MSG	2.4.1.1
Calls		
Function	Where Described	
get_overlay	Sec. 2.10.2.1.2	
get_control_measure	Sec. 2.10.2.1.3	
DEBUG_CM	Sec. 2.10.2.2	
copy_float_point_list_to_ real_point_list	Sec. 2.10.2.1.1	
get_symbol	Sec. 2.1.1.3.2	
cm_force_overlay_ recalculation	Sec. 2.10.2.1.23	

**Table 2.10-45: cm\_add\_area CSU [8.10.2.1.9]**

**2.10.2.1.10 cm\_add\_zone CSU**

This CSU adds a zone control measure from the SBX connection to an overlay.

Parameters		
Parameters	Type	Where Typedef Declared
sbx_connection	pointer to SBX CONNECTION_VARS	Sec. 2.4.3.3
msg_ptr	pointer to ZONE_MSG	Sec. 2.4.1.1
Calls		
Function	Where Described	
get_overlay	Sec. 2.10.2.1.2	
get_control_measure	Sec. 2.10.2.1.3	
DEBUG_CM	Sec. 2.10.2.2	
copy_float_point_list_to_ real_point_list	Sec. 2.10.2.1.1	
get_symbol	Sec. 2.1.1.3.2	
cm_force_overlay_ recalculation	Sec. 2.10.2.1.23	

**Table 2.10-46: cm\_add\_zone CSU [8.10.2.1.10]**

**2.10.2.1.11 cm\_add\_line CSU**

This CSU adds a line control measure from the SBX connection to an overlay.

Parameters		
Parameters	Type	Where Typedef Declared
sbx_connection	pointer to SBX_CONNECTION_VARS	Sec. 2.4.3.3
msg_ptr	pointer to LINE_MSG	2.4.1.1
Calls		
Function	Where Described	
get_overlay	Sec. 2.10.2.1.2	
get_control_measure	Sec. 2.10.2.1.3	
DEBUG CM	Sec. 2.10.2.2	
copy_float_point_list_to_ real_point_list	Sec. 2.10.2.1.1	
get_symbol	Sec. 2.1.1.3.2	
cm_force_overlay_ recalculation	Sec. 2.10.2.1.23	

Table 2.10-47: cm\_add\_line CSU [8.10.2.1.11]

**2.10.2.1.12 cm\_add\_route CSU**

This CSU adds a route control measure from the SBX connection to an overlay. If the route is already in use, the vehicles using the route are updated to use the new route.

Parameters		
Parameters	Type	Where Typedef Declared
sbx_connection	pointer to SBX_CONNECTION_VARS	Sec. 2.4.3.3
msg_ptr	pointer to ROUTE_MSG	Sec. 2.4.1.1
Calls		
Function	Where Described	
get_overlay	Sec. 2.10.2.1.2	
get_control_measure	Sec. 2.10.2.1.3	
DEBUG CM	Sec. 2.10.2.2	
generate_route_from_route msg	Sec. 2.10.2.4.7	
FOR VEHICLES DO	Sec. 2.9.3.2	
p_follower_comp_reset route	Sec. 2.6.4.3.4	
re_assign_routepoints	Sec. 2.10.2.4.13	
vec2_copy	Sec. 2.14.3.5.29	
OBJ POSITION	Sec. 2.9.1.1	
pilot_start_gotopoint	Sec. 2.6.4.2.26	
destroy_route	Sec. 2.10.2.4.4	

Table 2.10-48: cm\_add\_route CSU [8.10.2.1.12]

**2.10.2.1.13 cm\_delete\_overlay CSU**

This CSU deletes control measures from the SBX connection.

Parameters		
Parameters	Type	Where Typedef Declared
sbx_connection	pointer to SBX_CONNECTION_VARS	Sec. 2.4.3.3
overlay_id	int	Standard
Calls		
Function	Where Described	
cm_find_overlay_list_item	Sec. 2.10.2.1.4	
DEBUG CM	Sec. 2.10.2.2	
cm_delete_cm_from_overlay	Sec. 2.10.2.1.15	
destroy_overlay	Sec. 2.10.2.1.32	
destroy_overlay_list_item	Sec. 2.10.2.1.33	

**Table 2.10-49: cm\_delete\_overlay CSU [8.10.2.1.13]**

**2.10.2.1.14 cm\_delete\_cm CSU**

This CSU deletes a control measure from an overlay, and updates any vehicles using that overlay.

Parameters		
Parameters	Type	Where Typedef Declared
sbx_connection	pointer to SBX_CONNECTION_VARS	Sec. 2.4.3.3
msg_ptr	pointer to DELETE_CM_MSG	Sec. 2.4.1.1
Calls		
Function	Where Described	
cm_find_overlay	Sec. 2.10.2.1.5	
cm_delete_cm_from_overlay	Sec. 2.10.2.1.15	
cm_force_overlay_recalculation	Sec. 2.10.2.1.23	

**Table 2.10-50: cm\_delete\_cm CSU [8.10.2.1.14]**

**2.10.2.1.15 cm\_delete\_cm\_from\_overlay CSU**

This CSU deletes a control measure from an overlay.

Parameters		
Parameters	Type	Where Typedef Declared
overlay	pointer to OVERLAY	Sec. 2.10.2.2
cm_id	int	Standard

Calls	
Function	Where Described
cm find cm list item	Sec. 2.10.2.1.6
DEBUG CM	Sec. 2.10.2.2
fragment route	Sec. 2.10.2.4.12
destroy cm data	Sec. 2.10.2.1.24
destroy cm	Sec. 2.10.2.1.29
destroy cm list item	Sec. 2.10.2.1.30

Table 2.10-51: cm\_delete\_cm\_from\_overlay CSU [8.10.2.1.15]

## 2.10.2.1.16 cm\_applies\_to\_units CSU

This CSU determines which units are using a particular overlay.

Parameters		
Parameters	Type	Where Typedef Declared
num units	unsigned short	Standard
applies to[ ]	unsigned short	Standard
id	int	Standard
ReturnValues		
Return Value	Type	Meaning
TRUE	int	using overlay
FALSE	int	not using overlay

Table 2.10-52: cm\_applies\_to\_units CSU [8.10.2.1.16]

## 2.10.2.1.17 cm\_get\_cm\_from\_overlay CSU

This CSU returns all control measures currently in use by a SAF unit.

Parameters		
Parameters	Type	Where Typedef Declared
id	unsigned int	Standard
overlay	pointer to OVERLAY	Sec. 2.10.2.2
ReturnValues		
Return Value	Type	Meaning
result	pointer to CONTROL MEASURE LIST	control measures in use by SAF unit
Calls		
Function	Where Described	
cm applies to unit	Sec. 2.10.2.1.16	

Table 2.10-53: cm\_get\_cm\_from\_overlay CSU [8.10.2.1.17]



**2.10.2.1.18 is\_cm\_executed\_in\_list CSU**

This CSU returns a list of control measures which have been executed by a particular SAF unit.

Parameters		
Parameters	Type	Where Typedef Declared
id	int	Standard
list	pointer to CONTROL MEASURE LIST	Sec. 2.10.2.2
ReturnValues		
Return Value	Type	Meaning
list->executed	int	CM executed
FALSE	int	CM executed not found

Table 2.10-54: is\_cm\_executed\_in\_list CSU [8.10.2.1.18]

**2.10.2.1.19 cm\_recompute\_cm\_from\_overlay CSU**

This CSU remakes the control measure list.

Parameters		
Parameters	Type	Where Typedef Declared
id	unsigned int	Standard
overlay	pointer to OVERLAY	Sec. 2.10.2.2
old_cm	pointer to CONTROL MEASURE LIST	Sec. 2.10.2.2
ReturnValues		
Return Value	Type	Meaning
result	pointer to CONTROL MEASURE LIST	control measure list
Calls		
Function	Where Described	
cm applies to unit	Sec. 2.10.2.1.16	
allocate_control_measure_list item	Sec. 2.10.2.2	
is cm executed in list	Sec. 2.10.2.1.18	

Table 2.10-55: cm\_recompute\_cm\_from\_overlay CSU [8.10.2.1.19]

**2.10.2.1.20 cm\_execute\_overlay CSU**

This CSU executes an overlay from the SBX connection.

Parameters		
Parameters	Type	Where Typedef Declared
sbx_connection	pointer to SBX_CONNECTION_VARS	Sec. 2.4.3.3
msg_ptr	pointer to EXECUTE_OVERLAY_MSG	Sec. 2.4.1.1
Calls		
Function	Where Described	
LOOKUP_VEHICLE	Sec. 2.9.1.1	
DEBUG_CM	Sec. 2.5.2.2	
OBJ_OWNER_PORT_NUMBER	Sec. 2.9.1.1	
cm_find_overlay	Sec. 2.10.2.1.5	
allocate_control_measure	Sec. 2.10.2.2	
generate_inplace_route	Sec. 2.10.2.4.8	
cm_find_cm	Sec. 2.10.2.1.7	
remove_executing_unit	Sec. 2.10.2.1.22	
add_executing_unit	Sec. 2.10.2.1.21	
clear_cis_stack	Sec. 2.10.1.1.14	
activate_new_cis	Sec. 2.10.1.1.16	
get_symbol	Sec. 2.1.1.3.2	
execute_overlay	Sec. 2.14.1.1.8	

**Table 2.10-56: cm\_execute\_overlay CSU [8.10.2.1.20]**

**2.10.2.1.21 add\_executing\_unit CSU**

This CSU adds a unit to an overlay when that unit starts executing the overlay.

Parameters		
Parameters	Type	Where Typedef Declared
unitid	unsigned int	Standard
overlay	pointer to OVERLAY	Sec. 2.10.2.2
Calls		
Function	Where Described	
allocate_veh_id_list	Sec. 2.8.2.2	

**Table 2.10-57: add\_executing\_unit CSU [8.10.2.1.21]**

**2.10.2.1.22      remove\_executing\_unit CSU**

This CSU removes a SAF unit from an overlay.

Parameters		
Parameters	Type	Where Typedef Declared
unitid	unsigned int	Standard
overlays	pointer to OVERLAY_LIST	Sec. 2.10.2.2
Calls		
Function	Where Described	
deallocate veh id list	Sec. 2.8.2.2	

**Table 2.10-58:    remove\_executing\_unit CSU [8.10.2.1.22]**

**2.10.2.1.23      cm\_force\_overlay\_recalculation CSU**

This CSU cycles through all of the units using a particular overlay and forces them to update their information about that overlay.

Parameters		
Parameters	Type	Where Typedef Declared
overlay	pointer to OVERLAY	Sec. 2.10.2.2
Calls		
Function	Where Described	
readjust overlay	Sec. 2.14.1.1.9	
LOOKUP SAFOBJ	Sec. 2.9.1.1	

**Table 2.10-59:    cm\_force\_overlay\_recalculation CSU [8.10.2.1.23]**

**2.10.2.1.24      destroy\_cm\_data CSU**

This CSU destroys a control measure type, based on type passed.

Parameters		
Parameters	Type	Where Typedef Declared
type	int	Standard
control_measure_union	pointer to CONTROL_MEASURE_UNION	Sec. 2.10.2.2
Calls		
Function	Where Described	
destroy_point_cm	Sec. 2.10.2.1.25	
destroy_area_cm	Sec. 2.10.2.1.26	
destroy_zone_cm	Sec. 2.10.2.1.27	
destroy_line_cm	Sec. 2.10.2.1.28	
destroy_route	Sec. 2.10.2.4.4	

**Table 2.10-60:    destroy\_cm\_data CSU [8.10.2.1.24]**

**2.10.2.1.25 destroy\_point\_cm CSU**

This CSU calls deallocate\_point\_cm in order to destroy a point control measure.

Parameters		
Parameters	Type	Where Typedef Declared
point	pointer to POINT_CM	Sec. 2.10.2.2
Calls		
Function	Where Described	
deallocate_point_cm	Sec. 2.10.2.2	

Table 2.10-61: destroy\_point\_cm CSU [8.10.2.1.25]

**2.10.2.1.26 destroy\_area\_cm CSU**

This CSU calls deallocate\_area\_cm in order to destroy an area control measure.

Parameters		
Parameters	Type	Where Typedef Declared
area	pointer to AREA_CM	Sec. 2.10.2.2
Calls		
Function	Where Described	
deallocate_area_cm	Sec. 2.	

Table 2.10-62: destroy\_area\_cm CSU [8.10.2.1.26]

**2.10.2.1.27 destroy\_zone\_cm CSU**

This CSU calls deallocate\_zone\_cm in order to destroy a zone control measure.

Parameters		
Parameters	Type	Where Typedef Declared
zone	pointer to ZONE_CM	Sec. 2.10.2.2
Calls		
Function	Where Described	
deallocate_zone_cm	Sec. 2.10.2.2	

Table 2.10-63: destroy\_zone\_cm CSU [8.10.2.1.27]

**2.10.2.1.28 destroy\_line\_cm CSU**

This CSU calls deallocate\_line\_cm in order to destroy a line control measure.

Parameters		
Parameters	Type	Where Typedef Declared
line	pointer to LINE_CM	Sec. 2.10.2.2
Calls		
Function	Where Described	
deallocate_line_cm	Sec. 2.10.2.2	

**Table 2.10-64: destroy\_line\_cm CSU [8.10.2.1.28]**

**2.10.2.1.29 destroy\_cm CSU**

This CSU calls deallocate\_control\_measure in order to deallocate a control measure.

Parameters		
Parameters	Type	Where Typedef Declared
cm	pointer to CONTROL_MEASURE	Sec. 2.10.2.2
Calls		
Function	Where Described	
deallocate_control_measure	Sec. 2.10.2.2	

**Table 2.10-65: destroy\_cm CSU [8.10.2.1.29]**

**2.10.2.1.30 destroy\_cm\_list\_item CSU**

This CSU calls deallocate\_measure\_list\_item in order to remove a control measure item from the list.

Parameters		
Parameters	Type	Where Typedef Declared
cmI	pointer to CONTROL_MEASURE_LIST	Sec. 2.10.2.2
Calls		
Function	Where Described	
deallocate_control_measure_list_item	Sec. 2.10.2.2	

**Table 2.10-66: destroy\_cm\_list\_item CSU [8.10.2.1.30]**

**2.10.2.1.31 destroy\_cm\_list CSU**

This CSU frees up a control measure list by setting the pointers to next and previous lists to NULL and calling destroy\_cm\_list\_item CSU to deallocate the control measure list item's memory.

Parameters		
Parameters	Type	Where Typedef Declared
cmi	pointer to CONTROL MEASURE LIST	Sec. 2.10.2.2
Calls		
Function	Where Described	
destroy_cm_list_item	Sec. 2.10.2.1.30	

Table 2.10-67: destroy\_cm\_list CSU [8.10.2.1.31]

**2.10.2.1.32 destroy\_overlay CSU**

This CSU calls destroy veh\_id\_list to remove the vehicle id list, and deallocate\_overlay to give up the overlay memory.

Parameters		
Parameters	Type	Where Typedef Declared
overlay	pointer to OVERLAY	Sec. 2.10.2.2
Calls		
Function	Where Described	
destroy veh_id_list	Sec. 2.8.2.1.12	
deallocate_overlay	Sec. 2.10.2.2	

Table 2.10-68: destroy\_overlay CSU [8.10.2.1.32]

**2.10.2.1.33 destroy\_overlay\_list\_item CSU**

This CSU calls deallocate\_overlay\_list\_item to remove an overlay item from the list.

Parameters		
Parameters	Type	Where Typedef Declared
overlay	pointer to OVERLAY	Sec. 2.10.2.2
Calls		
Function	Where Described	
deallocate_overlay_list_item	Sec. 2.10.2.2	

Table 2.10-69: destroy\_overlay\_list\_item CSU [8.10.2.1.33]

**2.10.2.1.34 show\_overlays CSU**

This CSU displays the overlays in the overlay list through a call to show\_overlay CSU.

Parameters		
Parameters	Type	Where Typedef Declared
overlay_list	pointer to OVERLAY_LIST	Sec. 2.10.2.2
Calls		
Function	Where Described	
show_overlay	Sec. 2.10.2.1.35	

**Table 2.10-70: show\_overlays CSU [8.10.2.1.34]**

**2.10.2.1.35 show\_overlay CSU**

This CSU displays an overlay through calls to show\_vehicle\_id\_list and show\_control\_measures.

Parameters		
Parameters	Type	Where Typedef Declared
overlay	pointer to OVERLAY	Sec. 2.10.2.2
Calls		
Function	Where Described	
show_vehicle_id_list	Sec. 2.8.2.1.9	
show_control_measures	Sec. 2.10.2.1.36	

**Table 2.10-71: show\_overlay CSU [8.10.2.1.35]**

**2.10.2.1.36 show\_control\_measures CSU**

This CSU displays a list of control measures through calls to show\_control\_measures.

Parameters		
Parameters	Type	Where Typedef Declared
cm_list	pointer to CONTROL_MEASURE_LIST	Sec. 2.10.2.2
show_flag	int	Standard
Calls		
Function	Where Described	
show_control_measure	Sec. 2.10.2.1.37	

**Table 2.10-72: show\_control\_measures CSU [8.10.2.1.36]**

**2.10.2.1.37 show\_control\_measure CSU**

This CSU displays a control measure whose type is a function of the parameter passed.

Parameters		
Parameters	Type	Where Typedef Declared
cm	pointer to CONTROL_MEASURE	Sec. 2.10.2.2
Calls		
Function	Where Described	
show_point_cm	Sec. 2.10.2.1.39	
show_area_cm	Sec. 2.10.2.1.40	
show_zone_cm	Sec. 2.10.2.1.41	
show_line_cm	Sec. 2.10.2.1.42	
show_route	Sec. 2.10.2.4.14	
show_applies_to	Sec. 2.10.2.1.43	

Table 2.10-73: show\_control\_measure CSU [8.10.2.1.37]

**2.10.2.1.38 show\_point\_list CSU**

This CSU displays a list of points.

Parameters		
Parameters	Type	Where Typedef Declared
prefix	pointer to char	Standard
points	pointer to CM_POINT_LIST	Sec. 2.10.2.2

Table 2.10-74: show\_point\_list CSU [8.10.2.1.38]

**2.10.2.1.39 show\_point\_cm CSU**

This CSU displays a control measure point.

Parameters		
Parameters	Type	Where Typedef Declared
point_cm	pointer to POINT_CM	Sec. 2.10.2.2

Table 2.10-75: show\_point\_cm CSU [8.10.2.1.39]

**2.10.2.1.40 show\_area\_cm CSU**

This CSU displays an area type combat instruction set report.

Parameters		
Parameters	Type	Where Typedef Declared
area_cm	pointer to AREA_CM	Sec. 2.10.2.2



Calls	
Function	Where Described
show_point_list	Sec. 2.10.2.1.38

Table 2.10-76: show\_area\_cm CSU [8.10.2.1.40]

**2.10.2.1.41 show\_zone\_cm CSU**

This CSU displays a zone type combat instruction set report.

Parameters		
Parameters	Type	Where Typedef Declared
zone_cm	pointer to ZONE_CM	Sec. 2.10.2.2
Calls		
Function	Where Described	
show_point_list	Sec. 2.10.2.1.38	

Table 2.10-77: show\_zone\_cm CSU [8.10.2.1.41]

**2.10.2.1.42 show\_line\_cm CSU**

This CSU displays a line type combat instruction set report.

Parameters		
Parameters	Type	Where Typedef Declared
line_cm	pointer to LINE_CM	Sec. 2.10.2.2
Calls		
Function	Where Described	
show_point_list	Sec. 2.10.2.1.38	

Table 2.10-78: show\_line\_cm CSU [8.10.2.1.42]

**2.10.2.1.43 show\_applies\_to CSU**

This CSU displays a list of all "applies to" units ids.

Parameters		
Parameters	Type	Where Typedef Declared
num	unsigned short	Standard
who[ ]	unsigned short	Standard

Table 2.10-79: show\_applies\_to CSU [8.10.2.1.43]

**2.10.2.2 cm.h CSU**

/simnet/src/host/cm.h

This CSU contains all of the definitions and symbolic constants needed by the control measure code. Macros which are used for allocating and deallocating control measures are described in Appendix A. The constants are defined in the following table.

Constant	Value
CM_TYPE POINT	0
CM_TYPE AREA	1
CM_TYPE ZONE	2
CM_TYPE LINE	3
CM_TYPE ROUTE	4
CM_TYPE ANY	5

**Table 2.10-80: cm.h Constant Definitions**

The following tables describe the internal data structures that represent the different types of control measures.

The following typedef struct is tagged point\_cm.

Item	Type	Where Type Defined
x	REAL	sim_types.h
y	REAL	sim_types.h
route_id	int	Standard
speed	REAL	sim_types.h
cis	pointer to char	Standard
report	short	Standard

**Table 2.10-81: POINT\_CM Structure Definition**

The following typedef struct is tagged area\_cm.

Item	Type	Where Type Defined
points	CM_POINT_LIST	Sec. 2.4.1.1
type	pointer to char	Standard
speed	REAL	sim_types.h
cis	pointer to char	Standard
report	short	Standard

**Table 2.10-82: AREA\_CM Structure Definition**

The following typedef struct is tagged zone\_cm.

Item	Type	Where Type Defined
points	CM_POINT_LIST	Sec. 2.4.1.1
type	pointer to char	Standard
speed	REAL	sim_types.h
cis	pointer to char	Standard
report	short	Standard

**Table 2.10-83: ZONE\_CM Structure Definition**

The following typedef struct is tagged line\_cm.

Item	Type	Where Type Defined
points	CM_POINT_LIST	Sec. 2.4.1.1
speed	REAL	sim_types.h
cis	pointer to char	Standard
report	short	Standard

**Table 2.10-84: LINE\_CM Structure Definition**

This union allows the passing around of one of these specific control measures without having to know which specific type it is.

Item	Type	Where Type Defined
point	pointer to POINT_CM	This include file
area	pointer to AREA_CM	This include file
zone	pointer to ZONE_CM	This include file
line	pointer to LINE_CM	This include file
route	pointer to ROUTE	Sec. 2.10.2.5 route.h

**Table 2.10-85: CONTROL\_MEASURE\_UNION Union Definition**

The following typedef struct is tagged control\_measure.

Item	Type	Where Type Defined
id	int	Standard
name[CM_NAME_SIZE]	char	Standard
overlay_id	int	Standard
access_count	int	Standard
num_units	unsigned short	Standard
applies_to[NUM_APPLICABLE_UNITS]	unsigned short	Standard
cm_type	int	Standard
cm_data	CONTROL_MEASURE_UNION	This include file

**Table 2.10-86: CONTROL\_MEASURE Structure Definition**

The following typedef struct is tagged `control_measure_list`. An `control_measure_list` is a double-linked list. The first two items are data for this control measure. The last two items point to the data for the next and previous overlays.

Item	Type	Where Type Defined
cm	pointer to CONTROL_MEASURE	This include file
executed	unsigned char	Standard
next	pointer to struct control_measure_list	This typedef struct
prev	pointer to struct control_measure_list	This typedef struct

**Table 2.10-87: CONTROL\_MEASURE\_LIST Structure Definition**

The following typedef struct is tagged `overlay`. An `overlay` is an identified list of control measures.

Item	Type	Where Type Defined
id	int	Standard
name[CM_NAME_SIZE]	int	Standard
access_count	int	Standard
control_measures	pointer to CONTROL_MEASURE_LIST	This include file
units	pointer to VEH_ID_LIST	

**Table 2.10-88: OVERLAY Structure Definition**

The following typedef struct is tagged `overlay_list`. An `overlay_list` is a double-linked list with each item containing an `overlay id` and a `control_measure_list`. The three items point to the data for the present, previous, and next overlay in that order.

Item	Type	Where Type Defined
overlay	pointer to OVERLAY	This include file
prev	pointer to struct overlay_list	This typedef struct
next	pointer to struct overlay_list	This typedef struct

**Table 2.10-89: OVERLAY\_LIST Structure Definition**

### 2.10.2.3 navigator.c CSC

/simnet/src/host/navigator.c

The navigator code handles moving the vehicles of the composite over the route. It also take care of notifying the Combat instruction set code when a control measure has been triggered by passing a point, leaving an area, etc.

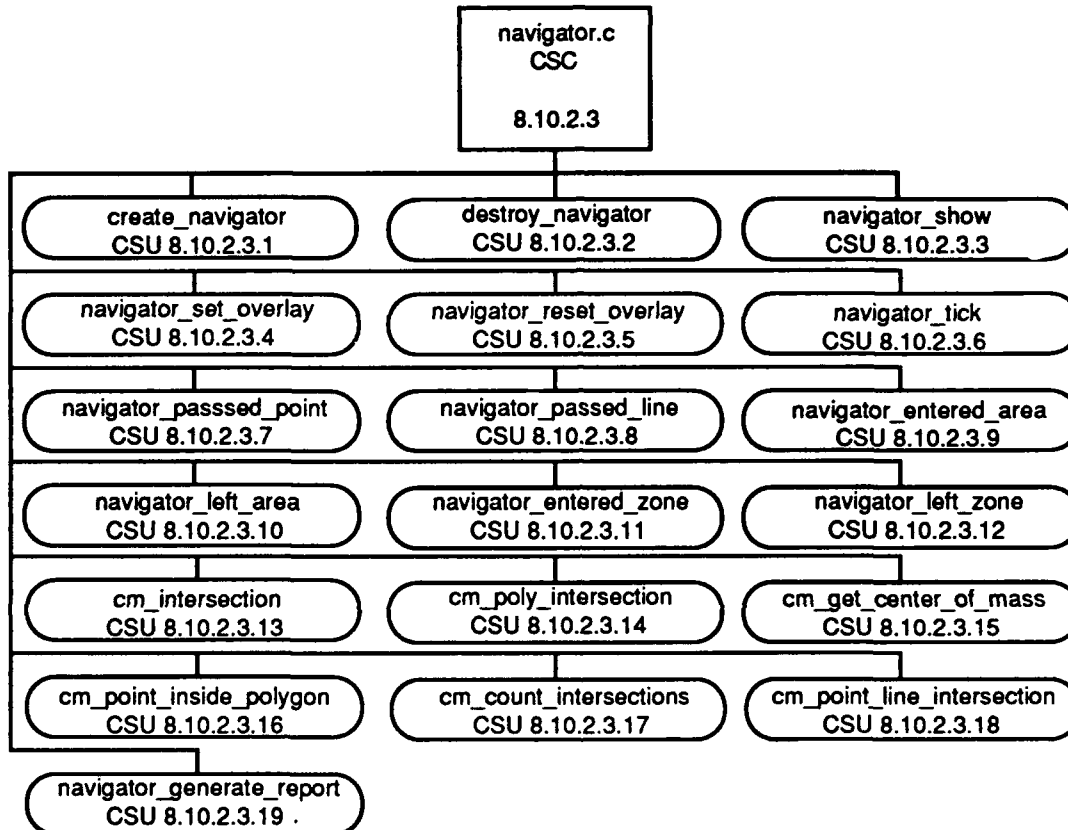


Figure 2.10-6: navigator.c CSC Structure

#### 2.10.2.3.1 create\_navigator CSU

This CSU creates a navigator structure.

ReturnValues		
Return Value	Type	Meaning
navigator	pointer to NAVIGATOR_VARS	pointer to the navigator structure
Calls		
Function	Where Described	
allocate_navigator	Sec. 2.9.1.2	

Table 2.10-90: create\_navigator CSU [8.10.2.3.1]

**2.10.2.3.2 destroy\_navigator CSU**

This CSU uses deallocate\_navigator to destroy the navigator.

Parameters		
Parameters	Type	Where Typedef Declared
navigator	pointer to NAVIGATOR_VARS	Sec. 2.9.1.2
Calls		
Function	Where Described	
deallocate_navigator	Sec. 2.9.1.2	

**Table 2.10-91: destroy\_navigator CSU [8.10.2.3.2]**

**2.10.2.3.3 navigator\_show CSU**

This CSU displays the contents of a navigator structure.

Parameters		
Parameters	Type	Where Typedef Declared
navigator	pointer to NAVIGATOR_VARS	Sec. 2.9.1.2
flags	int	Standard
Calls		
Function	Where Described	
show_control_measures	Sec. 2.10.2.1.36	

**Table 2.10-92: navigator\_show CSU [8.10.2.3.3]**

**2.10.2.3.4 navigator\_set\_overlay CSU**

This CSU sets the overlay slot of the navigator structure.

Parameters		
Parameters	Type	Where Typedef Declared
navigator	pointer to NAVIGATOR_VARS	Sec. 2.9.1.2
entity	pointer to ENTITY_VARS	Sec. 2.9.1.2
overlay	pointer to OVERLAY	Sec. 2.10.2.2
Calls		
Function	Where Described	
destroy_cm_list	Sec. 2.10.2.1.31	
cm_get_cm_from_overlay	Sec. 2.10.2.1.17	

**Table 2.10-93: navigator\_set\_overlay CSU [8.10.2.3.4]**

**2.10.2.3.5 navigator\_reset\_overlay CSU**

This CSU sets the control measure slot of the navigator structure.

Parameters		
Parameters	Type	Where Typedef Declared
navigator	pointer to NAVIGATOR_VARS	Sec. 2.9.1.2
entity	pointer to ENTITY_VARS	Sec. 2.9.1.2
overlay	pointer to OVERLAY	Sec. 2.10.2.2
Calls		
Function	Where Described	
cm_recompute_cm_from_overlay	Sec. 2.10.2.1.19	
destroy_cm_list	Sec. 2.10.2.1.30	

**Table 2.10-94: navigator\_reset\_overlay CSU [8.10.2.3.5]**

**2.10.2.3.6 navigator\_tick CSU**

This CSU checks for the interaction of a SAF unit with a control measure and calls the appropriate routine to change the unit's behavior based on the type of control measure passed.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Calls		
Function	Where Described	
cm_point_line_intersection	Sec. 2.10.2.3.18	
navigator_passed_point	Sec. 2.10.2.3.7	
cm_intersection	Sec. 2.10.2.3.13	
navigator_passed_line	Sec. 2.10.2.3.8	
cm_poly_intersection	Sec. 2.10.2.3.14	
cm_point_inside_polygon	Sec. 2.10.2.3.16	
navigator_entered_area	Sec. 2.10.2.3.9	
navigator_left_area	Sec. 2.10.2.3.10	
navigator_entered_zone	Sec. 2.10.2.3.11	
navigator_left_zone	Sec. 2.10.2.3.12	

**Table 2.10-95: navigator\_tick CSU [8.10.2.3.6]**

**2.10.2.3.7 navigator\_passed\_point CSU**

This CSU activates a new CIS attached to a point control measure.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
overlay	pointer to OVERLAY	Sec. 2.10.2.2
cm	pointer to CONTROL_MEASURE	Sec. 2.10.2.2
Calls		
Function	Where Described	
DEBUG NAVIGATOR	Sec. 2.5.2.2	
activate new cis	Sec. 2.10.1.1.16	

Table 2.10-96: navigator\_passed\_point CSU [8.10.2.3.7]

**2.10.2.3.8 navigator\_passed\_line CSU**

This CSU activates a new CIS attached to a line control measure.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
overlay	pointer to OVERLAY	Sec. 2.10.2.2
cm	pointer to CONTROL_MEASURE	Sec. 2.10.2.2
Calls		
Function	Where Described	
DEBUG NAVIGATOR	Sec. 2.5.2.2	
activate new cis	Sec. 2.10.1.1.16	

Table 2.10-97: navigator\_passed\_line CSU [8.10.2.3.8]

**2.10.2.3.9 navigator\_entered\_area CSU**

This CSU activates a new CIS when an area control measure is entered.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
overlay	pointer to OVERLAY	Sec. 2.10.2.2
cm	pointer to CONTROL_MEASURE	Sec. 2.10.2.2



Calls	
Function	Where Described
DEBUG NAVIGATOR	Sec. 2.5.2.2
activate_new_cis	Sec. 2.10.1.1.16

Table 2.10-98: navigator\_entered\_area CSU [8.10.2.3.9]

## 2.10.2.3.10 navigator\_left\_area CSU

This CSU detects when an area control measure is exited.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
overlay	pointer to OVERLAY	Sec. 2.10.2.2
cm	pointer to CONTROL_MEASURE	Sec. 2.10.2.2
Calls		
Function	Where Described	
DEBUG NAVIGATOR	Sec. 2.5.2.2	

Table 2.10-99: navigator\_left\_area CSU [8.10.2.3.10]

## 2.10.2.3.11 navigator\_entered\_zone CSU

This CSU activates a new CIS when a zone control measure is entered.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
overlay	pointer to OVERLAY	Sec. 2.10.2.2
cm	pointer to CONTROL_MEASURE	Sec. 2.10.2.2
Calls		
Function	Where Described	
DEBUG NAVIGATOR	Sec. 2.5.2.2	
activate_new_cis	Sec. 2.10.1.1.16	

Table 2.10-100: navigator\_entered\_zone CSU [8.10.2.3.11]

**2.10.2.3.14 cm\_poly\_intersection CSU**

This CSU calculates whether a line segment interacts with a polygonal control measure.

Parameters		
Parameters	Type	Where Typedef Declared
point_list	pointer to CM_POINT_LIST	Sec. 2.4.1.1
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
TRUE	int	intersected
FALSE	int	not intersected
Calls		
Function	Where Described	
line_intersection	Sec. 2.12.1.14.8	

**Table 2.10-103: cm\_poly\_intersection CSU [8.10.2.3.14]**

**2.10.2.3.15 cm\_get\_center\_of\_mass CSU**

This CSU calculates the center of mass of a control measure by averaging the points in a point list.

Parameters		
Parameters	Type	Where Typedef Declared
point_list	pointer to CM_POINT_LIST	Sec. 2.4.1.1
result	pointer to REAL	sim_types.h
Calls		
Function	Where Described	
vec2_init	Sec. 2.14.3.5.20	
vec2_scale	Sec. 2.14.3.5.28	

**Table 2.10-104: cm\_get\_center\_of\_mass CSU [8.10.2.3.15]**

**2.10.2.3.16 cm\_point\_inside\_polygon CSU**

This CSU calculates whether a point is inside a polygonal control measure by projecting rays towards infinity and counting the number of intersections with the polygon.

Parameters		
Parameters	Type	Where Typedef Declared
point_list	pointer to CM_POINT_LIST	Sec. 2.4.1.1
x	INT32	Sec. 2.12.1.18
y	INT32	Sec. 2.12.1.18

**2.10.2.3.12 navigator\_left\_zone CSU**

This CSU detects when a zone control measure is exited.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
overlay	pointer to OVERLAY	Sec. 2.10.2.2
cm	pointer to CONTROL_MEASURE	Sec. 2.10.2.2
Calls		
Function	Where Described	
DEBUG_NAVIGATOR	Sec. 2.5.2.2	

Table 2.10-101: navigator\_left\_zone CSU [8.10.2.3.12]

**2.10.2.3.13 cm\_intersection CSU**

This CSU calculates whether a line segment intersects a control measure point list.

Parameters		
Parameters	Type	Where Typedef Declared
point_list	pointer to CM_POINT_LIST	Sec. 2.4.1.1
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
TRUE	int	intersects
FALSE	int	does not intersect
Calls		
Function	Where Described	
line_intersection	Sec. 2.12.1.14.8	

Table 2.10-102: cm\_intersection CSU [8.10.2.3.13]

ReturnValues		
Return Value	Type	Meaning
(ODD P(count))	int	the number of intersections
TRUE	int	point is inside polygon
Calls		
Function	Where Described	
ODD P	Sec. 2.12.1.18	
cm count intersections	Sec. 2.10.2.3.17	

Table 2.10-105: cm\_point\_inside\_polygon CSU [8.10.2.3.16]

## 2.10.2.3.17 cm\_count\_intersections CSU

This CSU counts the number of times a line segment intersects a polygon. If the segment passes through a vertex of the polygon, -1 is returned which signifies a non-conclusive result.

Parameters		
Parameters	Type	Where Typedef Declared
point_list	pointer to CM_POINT_LIST	Sec. 2.4.1.1
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
-1	int	non conclusive result
sum	int	number of intersections
Calls		
Function	Where Described	
line intersection	Sec. 2.12.1.14.8	

Table 2.10-106: cm\_count\_intersections CSU [8.10.2.3.17]

## 2.10.2.3.18 cm\_point\_line\_intersection CSU

This CSU determines whether a line segment passes within 200 meters of a point, using a parallel distance calculation.

Parameters		
Parameters	Type	Where Typedef Declared
x1	int	Standard
y1	int	Standard
x2	int	Standard
y2	int	Standard
p1	int	Standard
p2	int	Standard

ReturnValues		
Return Value	Type	Meaning
TRUE	int	passes within 200 meters of a point
FALSE	int	does not pass within 200 meters of a point
Calls		
Function	Where Described	
distance	Sec. 2.12.1.11.1	

**Table 2.10-107: cm\_point\_line\_intersection CSU [8.10.2.3.18]**

#### 2.10.2.3.19 navigator\_generate\_report CSU

This CSU generates the string to be included in the message back to the workstation.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
action	pointer to char	Standard
cm	pointer to CONTROL_MEASURE	Sec. 2.10.2.2
Calls		
Function	Where Described	
sbx_printf	Sec. 2.4.3.2.8	
OBJ_VEHICLEID	Sec. 2.9.1.1	

**Table 2.10-108: navigator\_generate\_report CSU [8.10.2.3.19]**

### 2.10.2.4 route.c CSC

/simnet/src/host/route.c

This CSC contains all the code for creating and destroying routes, handling special cases such as bridges, and modifying existing routes.

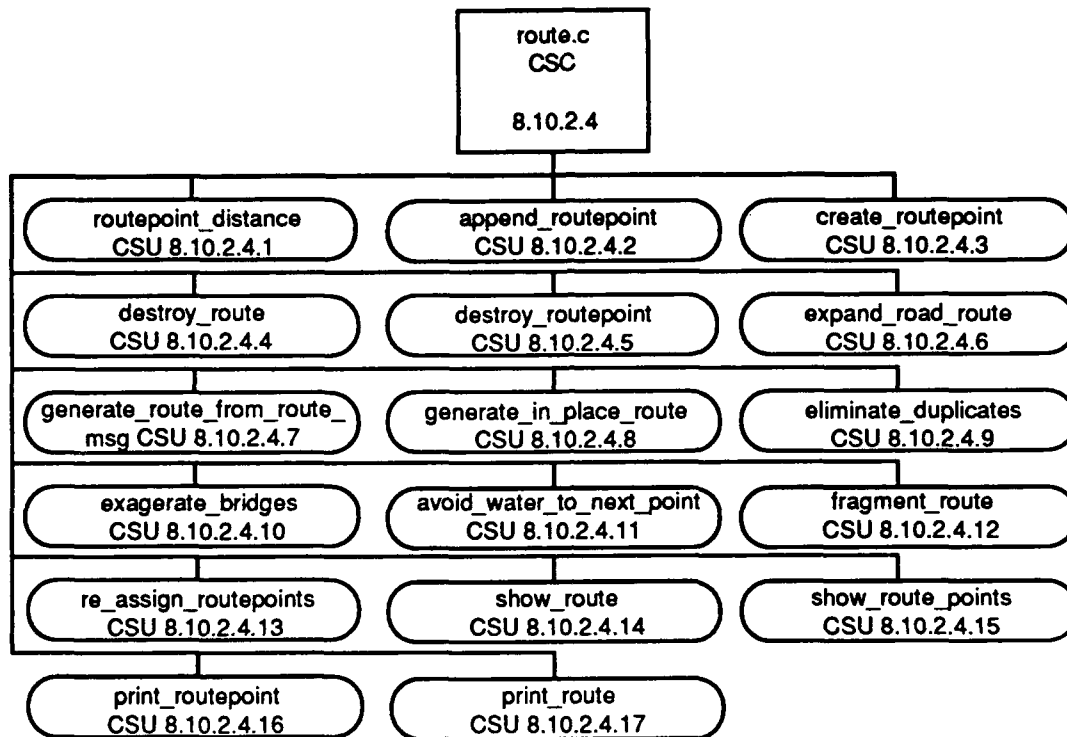


Figure 2.10-7: route.c CSC Structure

#### 2.10.2.4.1 routepoint\_distance CSU

This CSU calculates the distance between two routepoints.

Parameters		
Parameters	Type	Where Typedef Declared
rpoint1	pointer to ROUTEPOINT	Sec. 2.10.2.5
rpoint2	pointer to ROUTEPOINT	Sec. 2.10.2.5
ReturnValues		
Return Value	Type	Meaning
(sqrt(...))	REAL	Distance between points
Calls		
Function	Where Described	
vec_sub	Sec. 2.6.2.65.1 Vehicles CSCI SDD	

Table 2.10-109: routepoint\_distance CSU [8.10.2.4.1]

**2.10.2.4.2 append\_routepoint CSU**

This CSU appends a routepoint onto the end of a route.

Parameters		
Parameters	Type	Where Typedef Declared
route	pointer to ROUTE	Sec. 2.10.2.5
routepoint	pointer to ROUTEPOINT	Sec. 2.10.2.5
Calls		
Function	Where Described	
routepoint distance	Sec. 2.10.2.4.1	

**Table 2.10-110: append\_routepoint CSU [8.10.2.4.2]**

**2.10.2.4.3 create\_routepoint CSU**

This CSU creates a new routepoint.

Parameters		
Parameters	Type	Where Typedef Declared
id	int	Standard
x	int	Standard
y	int	Standard
road	int	Standard
bridge	int	Standard
ReturnValues		
Return Value	Type	Meaning
routepoint	pointer to ROUTEPOINT	Pointer to routepoint
Calls		
Function	Where Described	
allocate routepoint	Sec. 2.10.2.5	

**Table 2.10-111: create\_routepoint CSU [8.10.2.4.3]**

**2.10.2.4.4 destroy\_route CSU**

This CSU destroys a route by calling destroy\_routepoint to remove all routpoints, and deallocate\_route to remove the route memory heap.

Parameters		
Parameters	Type	Where Typedef Declared
route	pointer to ROUTE	Sec. 2.10.2.5

Calls	
Function	Where Described
destroy_routepoint	Sec. 2.10.2.4.5
deallocate_route	Sec. 2.10.2.5

Table 2.10-112: destroy\_route CSU [8.10.2.4.4]

## 2.10.2.4.5 destroy\_routepoint CSU

This CSU destroys a routepoint using deallocate\_routepoint.

Parameters		
Parameters	Type	Where Typedef Declared
route	pointer to ROUTE	Sec. 2.10.2.5
Calls		
Function	Where Described	
deallocate_routepoint	Sec. 2.10.2.5	

Table 2.10-113: destroy\_routepoint CSU [8.10.2.4.5]

## 2.10.2.4.6 expand\_road\_route CSU

This CSU takes the road segment indices and directions that come over from the workstation and expands them into a set of routepoints that specify each point in the road segments. The initial and final points are used to specify when a partial road segment is to be used.

Parameters		
Parameters	Type	Where Typedef Declared
segdir	pointer to SBX_ROUTE_PT	Sec. 2.4.1.1
initial	pointer to SBX_ROUTE_PT	Sec. 2.4.1.1
final	pointer to SBX_ROUTE_PT	Sec. 2.4.1.1
route	pointer to ROUTE	Sec. 2.10.2.5
Calls		
Function	Where Described	
create_routepoint	Sec. 2.10.2.4.3	
append_routepoint	Sec. 2.10.2.4.2	

Table 2.10-114: expand\_road\_route CSU [8.10.2.4.6]



**2.10.2.4.7 generate\_route\_from\_route\_msg CSU**

This CSU takes the route message from the workstation and creates a route. Road points are specified with a negative id value. Road points consist of road index/direction pairs, where route points consist of x,y locations.

Parameters		
Parameters	Type	Where Typedef Declared
route_msg	pointer to ROUTE MSG	Sec. 2.4.1.1
ReturnValues		
Return Value	Type	Meaning
NULL	pointer to ROUTE	No route message
route	pointer to ROUTE	Pointer to the route
Calls		
Function	Where Described	
allocate route	Sec. 2.10.2.4.2	
EVEN P	Sec. 2.12.1.18	
ODD P	Sec. 2.12.1.18	
expand road route	Sec. 2.10.2.4.6	
create routepoint	Sec. 2.10.2.4.3	
append routepoint	Sec. 2.10.2.4.2	
eliminate duplicates	Sec. 2.10.2.4.9	
exaggerate bridges	Sec. 2.10.2.4.10	

Table 2.10-115: generate\_route\_from\_route\_msg CSU [8.10.2.4.7]

**2.10.2.4.8 generate\_in\_place\_route CSU**

This CSU creates a route with a single point at the SAF object's current location.

Parameters		
Parameters	Type	Where Typedef Declared
safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
ReturnValues		
Return Value	Type	Meaning
route	pointer to ROUTE	Pointer to the route
Calls		
Function	Where Described	
OBJ POSITION	Sec. 2.9.1.1	
allocate route	Sec. 2.10.2.4.2	
create routepoint	Sec. 2.10.2.4.3	
append routepoint	Sec. 2.10.2.4.2	

Table 2.10-116: generate\_in\_place\_route CSU [8.10.2.4.8]

**2.10.2.4.9 eliminate\_duplicates CSU**

This CSU eliminates consecutive route points that have the same locations.

Parameters		
Parameters	Type	Where Typedef Declared
route	pointer to ROUTE	Sec. 2.10.2.5

**Table 2.10-117: eliminate\_duplicates CSU [8.10.2.4.9]**

**2.10.2.4.10 exaggerate\_bridges CSU**

This CSU marks route points that are near bridge points on a route.

Parameters		
Parameters	Type	Where Typedef Declared
route	pointer to ROUTE	Sec. 2.10.2.5
Calls		
Function	Where Described	
vec_sub	Sec. 2.6.2.65.1 Vehicles CSCI SDD	
vec2_dot	Sec. 2.14.3.5.24	

**Table 2.10-118: exaggerate\_bridges CSU [8.10.2.4.10]**

**2.10.2.4.11 avoid\_water\_to\_next\_point CSU**

This CSU attempts to modify routes that pass through water by searching for bridges, fording points, or river ends.

Parameters		
Parameters	Type	Where Typedef Declared
route_point	pointer to ROUTEPOINT	Sec. 2.10.2.5
offset	int	Standard
Calls		
Function	Where Described	
find route	Sec. 2.12.1.8.1	
last item	Sec. 2.12.1.7.10	
create routepoint	Sec. 2.10.2.4.3	
routepoint distance	Sec. 2.10.2.4.1	
free list	Sec. 2.12.1.7.4	

**Table 2.10-119: avoid\_water\_to\_next\_point CSU [8.10.2.4.11]**

**2.10.2.4.12 fragment\_route CSU**

This CSU goes down the route and breaks all the links.

Parameters		
Parameters	Type	Where Typedef Declared
route	pointer to ROUTE	Sec. 2.10.2.5

**Table 2.10-120: fragment\_route CSU [8.10.2.4.12]**

**2.10.2.4.13 re\_assign\_routepoints CSU**

This CSU replaces a route point on a route with a new route point.

Parameters		
Parameters	Type	Where Typedef Declared
old_point	pointer to ROUTEPOINT	Sec. 2.10.2.5
new_point	pointer to ROUTEPOINT	Sec. 2.10.2.5
Calls		
Function	Where Described	
vec2_sub	Sec. 2.14.3.5.23	
vec2_init	Sec. 2.14.3.5.20	
vec2_dot	Sec. 2.14.3.5.24	

**Table 2.10-121: re\_assign\_routepoints CSU [8.10.2.4.13]**

**2.10.2.4.14 show\_route CSU**

This CSU displays all the route points for a route through call(s) to show\_route\_points.

Parameters		
Parameters	Type	Where Typedef Declared
route	pointer to ROUTE	Sec. 2.10.2.5
Calls		
Function	Where Described	
show_route_points	Sec. 2.10.2.4.15	

**Table 2.10-122: show\_route CSU [8.10.2.4.14]**

**2.10.2.4.15 show\_route\_points CSU**

This CSU displays the route's points through calls to print\_routepoint.

Parameters		
Parameters	Type	Where Typedef Declared
pt	pointer to ROUTEPOINT	Sec. 2.10.2.5

Calls	
Function	Where Described
print_routepoint	Sec. 2.10.2.4.16

Table 2.10-123: show\_route\_points CSU [8.10.2.4.15]

**2.10.2.4.16 print\_routepoint CSU**

This CSU displays a route point passed, either bridge or road.

Parameters		
Parameters	Type	Where Typedef Declared
pt	pointer to ROUTEPOINT	Sec. 2.10.2.5

Table 2.10-124: print\_routepoint CSU [8.10.2.4.16]

**2.10.2.4.17 print\_route CSU**

The CSU displays the route passed by getting the points from the route and calling print\_routepoint.

Parameters		
Parameters	Type	Where Typedef Declared
route	pointer to ROUTE	Sec. 2.10.2.5
Calls		
Function	Where Described	
print_routepoint	Sec. 2.10.2.4.16	

Table 2.10-125: print\_route CSU [8.10.2.4.17]

**2.10.2.5 route.h CSU**

/simnet/src/host/route.h

This CSU contains the structures and macros (defined in Appendix A) needed by the route following code.

The following typedef struct is tagged routepoint.

Item	Type	Where Type Defined
prev	pointer to struct routepoint	This typedef struct
id	int	Standard
point	VECTOR	sim_types.h
next	pointer to struct routepoint	This typedef struct
road : 1	int	Standard
bridge :1	int	Standard
prev_dist	REAL	sim_types.h
next_dist	REAL	sim_types.h

**Table 2.10-126: ROUTEPOINT Structure Definition**

The following typedef struct is tagged route and consists of the route id along with pointers to the start and ending routepoints.

Item	Type	Where Type Defined
id	int	Standard
start	pointer to ROUTEPOINT	Previous typedef struct
end	pointer to ROUTEPOINT	Previous typedef struct

**Table 2.10-127: ROUTE Structure Definition**

## 2.11 CREATE CSC

This CSC contains the CSUs for creating units and vehicles. These CSUs are usually called from the SAF command interface but can also be called from the parser interface. They interpret the unit organization data from the parameter files to determine the hierarchy which needs to be created.

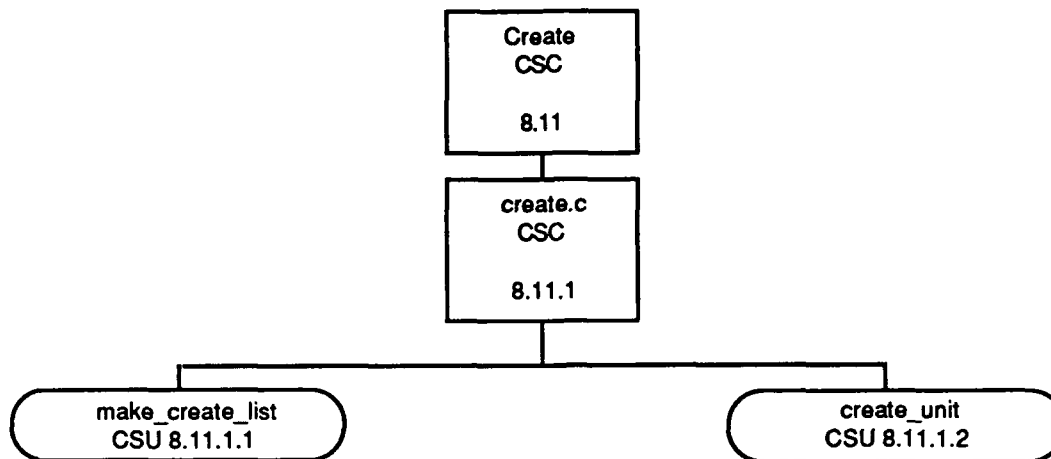


Figure 2.11-1: Create CSC Structure

### 2.11.1 create.c CSC

/simnet/src/host/create.c

This file creates the composites requested for the simulated vehicles, then has the vehicles created. In addition to the two CSUs, the file contains a structure, tagged `creation_item`, shown in the following table.

Item	Type	Where Type Defined
saf_type	unsigned short	Standard
*job	pointer to char	Standard
*echelon	pointer to char	Standard
*echelon_type	pointer to char	Standard
superior	unsigned short	Standard
rank	unsigned short	Standard
bumper	int	Standard

Table 2.11-1: CREATION\_ITEM Structure Definition

**2.11.1.1 make\_create\_list CSU**

This CSU generates a list of creation information used in the creation of a SAF object.

Parameters		
Parameters	Type	Where Typedef Declared
*table	pointer to DATA UNION	Sec. 2.1.1.5
*echelon	pointer to char	Standard
create_list[ ]	CREATION ITEM	Sec. 2.11.1 This CSC
vnum	unsigned short	Standard
superior	unsigned short	Standard
ReturnValues		
Return Value	Type	Meaning
vnum	unsigned short	Recursion.
Calls		
Function	Where Described	
find tag	Sec. 2.1.1.4.3	
make_create_list	Sec. 2.11.1.1	

Table 2.11-2: make\_create\_list CSU [8.11.1.1]

**2.11.1.2 create\_unit CSU**

This CSU creates a SAF object.

Parameters		
Parameters	Type	Where Typedef Declared
forceID	ForceID	basic.h
cD	unsigned char	Standard
cO	unsigned char	Standard
tactics	unsigned char	Standard
*echelon	pointer to char	Standard
*echelon_type	pointer to char	Standard
*formation	pointer to char	Standard
heading	REAL	sim_types.h
*position	pointer to REAL	sim_types.h
*owner	pointer to SBX_CONNECTION_VARS	Sec. 2.4.3.3
sbx_uniq_id	unsigned char	Standard
battalion	unsigned short	Standard
company	unsigned char	Standard
platoon	unsigned char	Standard
percent_amm0	REAL	sim_types.h
percent_fuel	REAL	sim_types.h

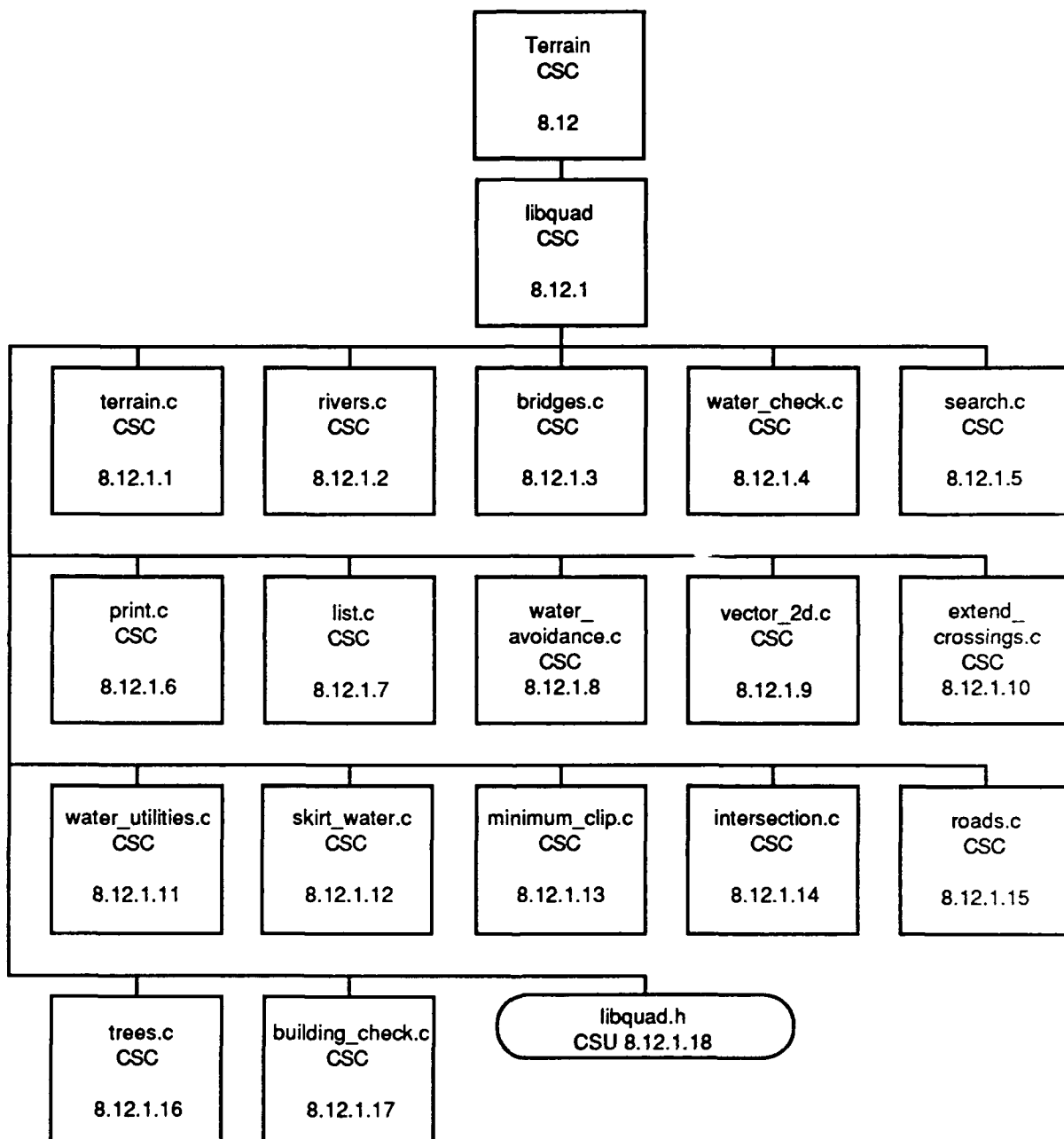
ReturnValues		
Return Value	Type	Meaning
0	unsigned int	No unit created.
OBJ_VEHICLEID(...)	unsigned int	Created unit.
Calls		
Function	Where Described	
RANGE CLIP	Sec. 2.14.3.9 See Appendix A	
find tag	Sec. 2.1.1.4.3	
make create list	Sec. 2.11.1.1	
create saf vehicle	Sec. 2.6.1.1.1	
saf vehicle start ticking	Sec. 2.6.1.1.3	
IS AIRCRAFT		
ft int	Sec. 2.14.1.2.11	
get symbol	Sec. 2.1.1.3.2	
create composite	Sec. 2.8.1.3.1	
composite start ticking	Sec. 2.8.1.3.11	
saf vehicle set superior	Sec. 2.6.1.1.4	
composite set superior	Sec. 2.8.1.3.4	
composite set sbx ids	Sec. 2.8.1.3.24	
composite get composite bumpers	Sec. 2.8.1.3.22	
composite assume formation	Sec. 2.8.1.3.26	
composite teleport to station	Sec. 2.8.1.3.28	
unit send pae data	Sec. 2.8.1.3.30	
OBJ_VEHICLEID	Sec. 2.9.1.1 See Appendix A	

Table 2.11-3: create\_unit CSU [8.11.1.2]



## 2.12 TERRAIN CSC

This CSC contains the data structures for representing the terrain which the vehicles traverse.



**Figure 2.12-1: Terrain CSC Structure**

There is a quadtree representation and a polygonal representation of the terrain. The quadtree represents terrain objects at a high level, and organizes them into a quadtree data structure. The polygonal data structure represents the terrain as a carpet of polygons. The quadtree database is used to reason about the terrain for road following, water avoidance, and obstacle avoidance. The polygonal representation is used to determine the support

polygon of the ground vehicles. It is used to determine the maximal accelerations of the vehicles as well as their orientations. It is also used to determine if two vehicles have a line of sight between them. This CSC contains many CSCs to access the terrain representations and to obtain data from them.

### 2.12.1 libquad CSC

/simnet/libsrc/libquad

This library handles terrain-handling functions, such as water skirting, road following, and bridge crossing, for vehicles.

#### 2.12.1.1 terrain.c CSC

/simnet/libsrc/libquad/terrain.c

This CSC contains CSUs dealing with the terrain database.

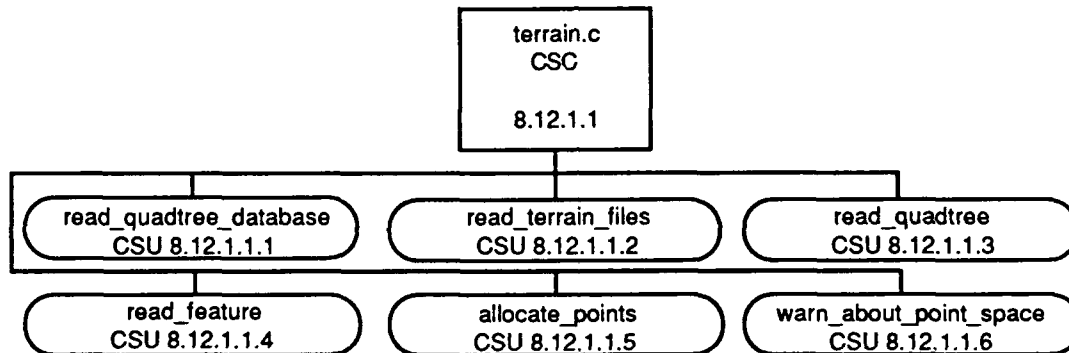


Figure 2.12-2: terrain.c CSC Structure

##### 2.12.1.1.1 read\_quadtree\_database CSU

This CSU reads the whole database.

Parameters		
Parameters	Type	Where Typedef Declared
directory	pointer to char	Standard
Calls		
Function	Where Described	
read_terrain_files	Sec. 2.12.1.1.2	
read_quadtree	Sec. 2.12.1.1.3	

Table 2.12-1: read\_quadtree\_database CSU [8.12.1.1.1]

**2.12.1.1.2 read\_terrain\_files CSU**

This CSU reads all feature files.

Parameters		
Parameters	Type	Where Typedef Declared
directory	pointer to char	Standard
Calls		
Function	Where Described	
create_rivers	Sec. 2.12.1.2.1	
create_river_ints	Sec. 2.12.1.2.3	
create_roads	Sec. 2.12.1.15.1	
create_road_ints	Sec. 2.12.1.15.3	
create_bridges	Sec. 2.12.1.3.1	
create_lakes	Sec. 2.12.1.3.3	
create_trees	Sec. 2.12.1.16.1	
create_tree_canopies	Sec. 2.12.1.16.3	
create_buildings	Sec. 2.12.1.16.5	
create_contours	Sec. 2.12.1.16.7	
warn_about_point_space	Sec. 2.12.1.1.6	

Table 2.12-2: read\_terrain\_files CSU [8.12.1.1.2]

**2.12.1.1.3 read\_quadtree CSU**

This CSU reads the quadtree and feature structures.

Parameters		
Parameters	Type	Where Typedef Declared
directory	pointer to char	Standard
Calls		
Function	Where Described	
heap_allocate	Sec. 2.14.2.1.1	
read_feature	Sec. 2.12.1.1.4	

Table 2.12-3: read\_quadtree CSU [8.12.1.1.3]

**2.12.1.1.4 read\_feature CSU**

This CSU reads a list of feature indices for a feature structure in a quad node.

Parameters		
Parameters	Type	Where Typedef Declared
fd	int	Standard
ReturnValues		
Return Value	Type	Meaning
feat	pointer to int	Number of indices.

Calls	
Function	Where Described
heap_allocate	Sec. 2.14.2.1.1

Table 2.12-4: read\_feature CSU [8.12.1.1.4]

## 2.12.1.1.5 allocate\_points CSU

This CSU allocates an array of points.

Parameters		
Parameters	Type	Where Typedef Declared
n	unsigned short	Standard
ReturnValues		
Return Value	Type	Meaning
ret	pointer to INT32	Allocated space.
Calls		
Function	Where Described	
heap_allocate	Sec. 2.14.2.1.1	

Table 2.12-5: allocate\_points CSU [8.12.1.1.5]

## 2.12.1.1.6 warn\_about\_point\_space CSU

This CSU warns the user when the point space is being increased.

## 2.12.1.2 rivers.c CSC

/simnet/libsrc/libquad/rivers.c

This CSC contains CSUs that deal with river creation (segments and intersections), and that print information on the above conditions if DEBUG is defined.

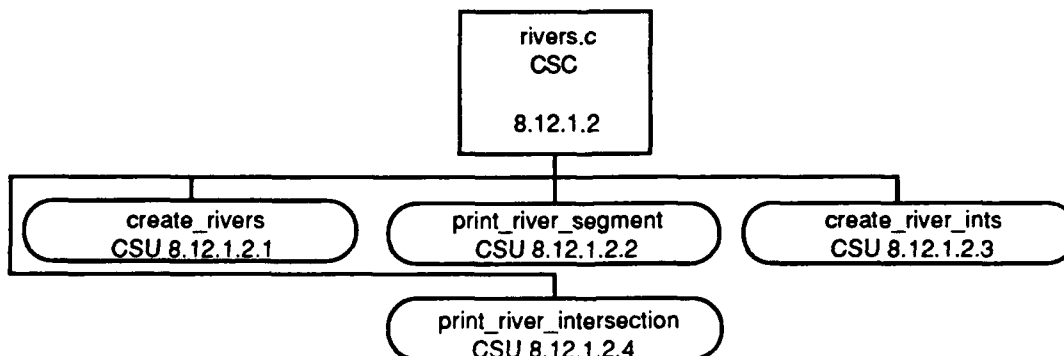


Figure 2.12-3: rivers.c CSC Structure

**2.12.1.2.1 create\_rivers CSU**

This CSU reads river segment structures.

Parameters		
Parameters	Type	Where Typedef Declared
directory	pointer to char	Standard
Calls		
Function	Where Described	
heap_allocate	Sec. 2.14.2.1.1	
allocate_points	Sec. 2.12.1.1.5	
print_river_segment	Sec. 2.12.1.2.2	

**Table 2.12-6: create\_rivers CSU [8.12.1.2.1]**

**2.12.1.2.2 print\_river\_segment CSU**

This CSU prints river segment information.

Parameters		
Parameters	Type	Where Typedef Declared
segment_index	int	Standard

**Table 2.12-7: print\_river\_segment CSU [8.12.1.2.2]**

**2.12.1.2.3 create\_river\_ints CSU**

This CSU creates river intersections.

Parameters		
Parameters	Type	Where Typedef Declared
directory	pointer to char	Standard
Calls		
Function	Where Described	
heap_allocate	Sec. 2.14.2.1.1	
print_river_intersection	Sec. 2.12.1.2.4	

**Table 2.12-8: create\_river\_ints CSU [8.12.1.2.3]**

**2.12.1.2.4 print\_river\_intersection CSU**

This CSU prints information about river intersections.

Parameters		
Parameters	Type	Where Typedef Declared
int_index	int	Standard

**Table 2.12-9: print\_river\_intersection CSU [8.12.1.2.4]**

### 2.12.1.3 bridges.c CSC

/simnet/libsrc/libquad/bridges.c

This CSC contains CSUs that deal with bridge and lake creation, and that print information about the above conditions if DEBUG is defined.

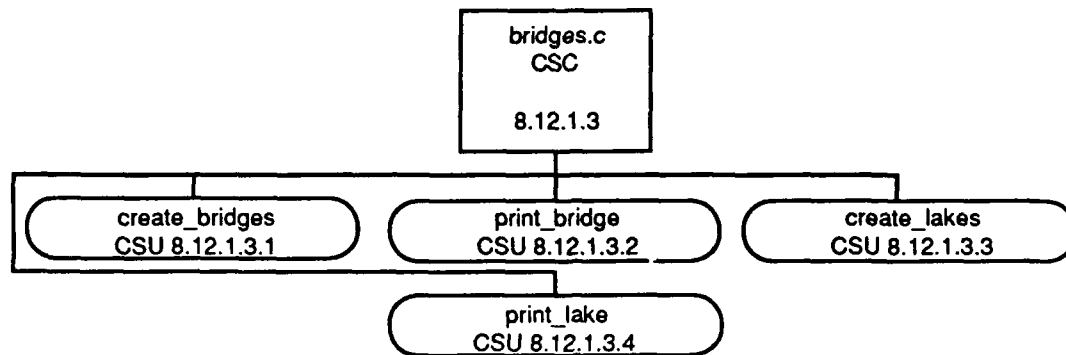


Figure 2.12-4: bridges.c CSC Structure

#### 2.12.1.3.1 create\_bridges CSU

This CSU reads bridge structures.

Parameters		
Parameters	Type	Where Typedef Declared
directory	pointer to char	Standard
Calls		
Function	Where Described	
heap_allocate	Sec. 2.14.2.1.1	
allocate_points	Sec. 2.12.1.1.5	
print_bridge	Sec. 2.12.1.3.2	

Table 2.12-10: create\_bridges CSU [8.12.1.3.1]

#### 2.12.1.3.2 print\_bridge CSU

This CSU prints information about a bridge.

Parameters		
Parameters	Type	Where Typedef Declared
bridge_index	int	Standard

Table 2.12-11: print\_bridge CSU [8.12.1.3.2]

### 2.12.1.3.3 create\_lakes CSU

This CSU reads lake structures.

Parameters		
Parameters	Type	Where Typedef Declared
directory	pointer to char	Standard
Calls		
Function	Where Described	
heap_allocate	Sec. 2.14.2.1.1	
allocate_points	Sec. 2.12.1.1.5	
print_lake	Sec. 2.12.1.3.4	

Table 2.12-12: create\_lakes CSU [8.12.1.3.3]

### 2.12.1.3.4 print\_lake CSU

This CSU prints information about a lake.

Parameters		
Parameters	Type	Where Typedef Declared
lake_index	int	Standard

Table 2.12-13: print\_lake CSU [8.12.1.3.4]

### 2.12.1.4 water\_check.c CSC

/simnet/libsrc/libquad/water\_check.c

This CSC consists of twelve CSUs which check for route intersections with lakes and rivers.

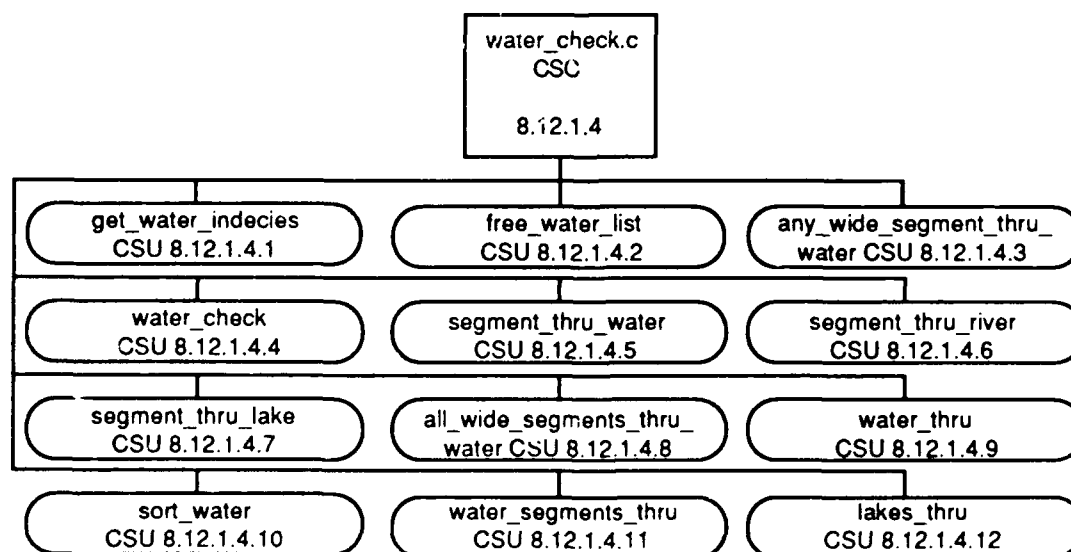


Figure 2.12-5: water\_check.c CSC Structure

**2.12.1.4.1 get\_water\_indicies CSU**

This CSU returns all of the river and lake indices that fall within a bounding box of a line segment.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
water_index_list	pointer to LIST	Water indices.
Calls		
Function	Where Described	
get_quad_nodes	Sec. 2.12.1.5.2	
MIN	See Appendix A	
push	Sec. 2.12.1.7.3	
free_list	Sec. 2.12.1.7.4	
remove_duplicates	Sec. 2.12.1.7.5	

Table 2.12-14: get\_water\_indicies CSU [8.12.1.4.1]

**2.12.1.4.2 free\_water\_list CSU**

This CSU frees a list of river and lake indices.

Parameters		
Parameters	Type	Where Typedef Declared
water_list	pointer to LIST	Sec. 2.12.1.18
Calls		
Function	Where Described	
free_list	Sec. 2.12.1.7.4	
FIRST	See Appendix A	
SECOND	See Appendix A	

Table 2.12-15: free\_water\_list CSU [8.12.1.4.2]



**2.12.1.4.3 any\_wide\_segment\_thru\_water CSU**

This CSU checks if a line segment intersects a river or lake, or whether lines parallel to the line segment intersect a river or lake. It returns the first water intersection found.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
offset	INT32	Sec. 2.12.1.18
water_index_list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
water	pointer to WATER_INT	Water intersection found.
NULL_PTR	pointer to WATER_INT	No water intersection found.
Calls		
Function	Where Described	
heap_allocate	Sec. 2.14.2.1.1	
segment_thru_water	Sec. 2.12.1.4.5	
VEC_SUB_2D	See Appendix A	
vec_normalize_2d	Sec. 2.12.1.9.2	
vec_rotate_2d	Sec. 2.12.1.9.3	
VEC_SCALE_2D	See Appendix A	
VEC_ADD_2D	See Appendix A	
heap_deallocate	Sec. 2.14.2.1.4	

Table 2.12-16: any\_wide\_segment\_thru\_water CSU [8.12.1.4.3]

**2.12.1.4.4 water\_check CSU**

This CSU checks whether a line segment intersects a river.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
return_val = TRUE	int	Line segment intersects a river.
return_val = FALSE	int	Line segment does not intersect a river.

Calls	
Function	Where Described
get water indecies	Sec. 2.12.1.4.1
segment thru river	Sec. 2.12.1.4.6
FIRST	See Appendix A
segment thru lake	Sec. 2.12.1.4.7
SECOND	See Appendix A
free water list	Sec. 2.12.1.4.2

Table 2.12-17: water\_check CSU [8.12.1.4.4]

## 2.12.1.4.5 segment\_thru\_water CSU

This CSU checks if a line segment intersects a river or lake.

Parameters		
Parameters	Type	Where Typedef Declared
xy1	pointer to VECTOR 2D	Sec. 2.12.1.18
xy2	pointer to VECTOR 2D	Sec. 2.12.1.18
water index list	pointer to LIST	Sec. 2.12.1.18
water	pointer to WATER_INT	Sec. 2.12.1.18
Calls		
Function	Where Described	
get water indecies	Sec. 2.12.1.4.1	
segment thru river	Sec. 2.12.1.4.6	
FIRST	See Appendix A	
segment thru lake	Sec. 2.12.1.4.7	
SECOND	See Appendix A	
free water list	Sec. 2.12.1.4.2	

Table 2.12-18: segment\_thru\_water CSU [8.12.1.4.5]

## 2.12.1.4.6 segment\_thru\_river CSU

This CSU checks whether a line segment intersects an unfordable river segment.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
index_list	pointer to LIST	Sec. 2.12.1.18
first_water	pointer to WATER_INT	Sec. 2.12.1.18

ReturnValues		
Return Value	Type	Meaning
TRUE	int	Line segment intersects an unfordable river segment.
FALSE	int	Line segment does not intersect an unfordable river segment.
Calls		
Function	Where Described	
possible intersection	Sec. 2.12.1.14.2	
seg_intersection	Sec. 2.12.1.14.1	

Table 2.12-19: segment\_thru\_river CSU [8.12.1.4.6]

## 2.12.1.4.7 segment\_thru\_lake CSU

This CSU checks whether a line segment intersects a lake polygon, or whether it is completely contained within a lake polygon.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
index_list	pointer to LIST	Sec. 2.12.1.18
first_water	pointer to WATER_INT	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Line segment intersects or is completely contained within a lake polygon.
FALSE	int	Line segment does not intersect and is not completely contained within a lake polygon.
Calls		
Function	Where Described	
possible intersection	Sec. 2.12.1.14.2	
seg_intersection	Sec. 2.12.1.14.1	
segment_inside_polygon	Sec. 2.12.1.14.5	

Table 2.12-20: segment\_thru\_lake CSU [8.12.1.4.7]

**2.12.1.4.8 all\_wide\_segments\_thru\_water CSU**

This CSU returns all of the intersections of a line segment, or lines parallel to the segment, with lakes and rivers.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
offset	INT32	Sec. 2.12.1.18
water_index_list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
original_list	pointer to LIST	List of intersections.
current_list	pointer to LIST	List of intersections.
Calls		
Function	Where Described	
water_thru	Sec. 2.12.1.4.9	
FIRST	See Appendix A	
VEC SUB 2D	See Appendix A	
vec_normalize_2d	Sec. 2.12.1.9.2	
vec_rotate_2d	Sec. 2.12.1.9.3	
VEC SCALE 2D	See Appendix A	
VEC ADD 2D	See Appendix A	
free_list	Sec. 2.12.1.7.4	

Table 2.12-21: all\_wide\_segments\_thru\_water CSU [8.12.1.4.8]

**2.12.1.4.9 water\_thru CSU**

This CSU returns a list of all of the intersections of a line segment with rivers and lakes. This list is sorted by distance from the first point of the line segment.

Parameters		
Parameters	Type	Where Typedef Declared
xy1	pointer to VECTOR_2D	Sec. 2.12.1.18
xy2	pointer to VECTOR_2D	Sec. 2.12.1.18
water_index_list	pointer to LIST	Sec. 2.12.1.18
water_list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
water_list	pointer to LIST	Sorted intersections.

Calls	
Function	Where Described
get water indecies	Sec. 2.12.1.4.1
water segments thru	Sec. 2.12.1.4.11
FIRST	See Appendix A
lakes thru	Sec. 2.12.1.4.12
SECOND	See Appendix A
sort water	Sec. 2.12.1.4.10
free_water_list	Sec. 2.12.1.4.2

Table 2.12-22: water\_thru CSU [8.12.1.4.9]

## 2.12.1.4.10 sort\_water CSU

This CSU sorts a list of water intersections by finding the two closest intersections to a point and putting them on the front of the list.

Parameters		
Parameters	Type	Where Typedef Declared
x	INT32	Sec. 2.12.1.18
y	INT32	Sec. 2.12.1.18
water_list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
water_list	pointer to LIST	Successful.
NULL_PTR	pointer to LIST	Unsuccessful.
Calls		
Function	Where Described	
distance	Sec. 2.12.1.11.1	
nthcdr	Sec. 2.12.1.7.8	
delete	Sec. 2.12.1.7.7	
push	Sec. 2.12.1.7.3	

Table 2.12-23: sort\_water CSU [8.12.1.4.10]

## 2.12.1.4.11 water\_segments\_thru CSU

This CSU returns a list of all river segments that intersect a line segment.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
index_list	pointer to LIST	Sec. 2.12.1.18
water_list	pointer to LIST	Sec. 2.12.1.18

ReturnValues		
Return Value	Type	Meaning
water_list	pointer to LIST	Intersecting river segments.
Calls		
Function	Where Described	
possible_intersection	Sec. 2.12.1.14.2	
line_intersection	Sec. 2.12.1.14.8	
heap_allocate	Sec. 2.14.2.1.1	
make_vector_2d	Sec. 2.12.1.9.1	
push	Sec. 2.12.1.7.3	

Table 2.12-24: water\_segments\_thru CSU [8.12.1.4.11]

## 2.12.1.4.12 lakes\_thru CSU

This CSU returns a list of all lakes that intersect a line segment.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
index_list	pointer to LIST	Sec. 2.12.1.18
water_list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
water_list	pointer to LIST	Intersecting lakes.
Calls		
Function	Where Described	
possible_intersection	Sec. 2.12.1.14.2	
segment_inside_polygon	Sec. 2.12.1.14.5	
heap_allocate	Sec. 2.14.2.1.1	
make_vector_2d	Sec. 2.12.1.9.1	
push	Sec. 2.12.1.7.3	
line_intersection	Sec. 2.12.1.14.8	

Table 2.12-25: lakes\_thru CSU [8.12.1.4.12]

### 2.12.1.5 search.c CSC

/simnet/libsrc/libquad/search.c

This CSC contain CSUs that deal with searching for, obtaining, analyzing, and testing the validity of quad nodes.

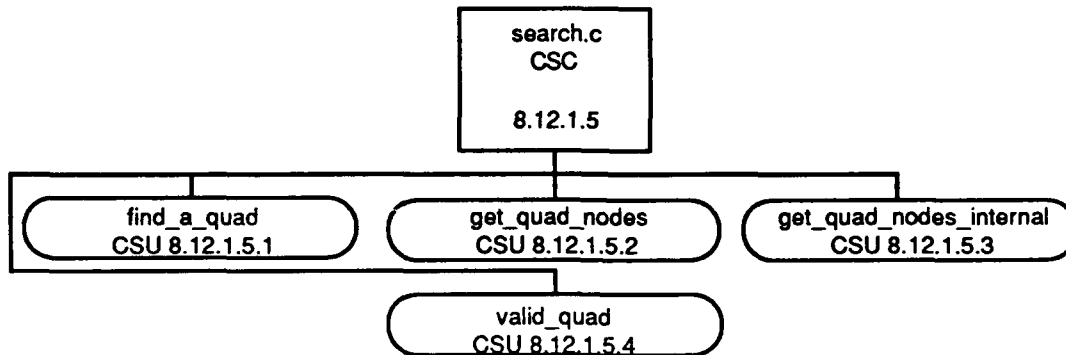


Figure 2.12-6: search.c CSC Structure

#### 2.12.1.5.1 find\_a\_quad CSU

This CSU returns the left quad tree node at the given location.

Parameters		
Parameters	Type	Where Typedef Declared
node	pointer to QUAD_NODE	Sec. 2.12.1.18
qx	INT32	Sec. 2.12.1.18
qy	INT32	Sec. 2.12.1.18
size	INT32	Sec. 2.12.1.18
x	INT32	Sec. 2.12.1.18
y	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
NULL_PTR	pointer to QUAD_FEATURES	No node found.
feature_array + node->feature_index	pointer to QUAD_FEATURES	Successful.
find_a_quad(...)	pointer to QUAD_FEATURES	Recursion.
Calls		
Function	Where Described	
find a quad	Sec. 2.12.1.5.1	

Table 2.12-26: find\_a\_quad CSU [8.12.1.5.1]

### 2.12.1.5.2 get\_quad\_nodes CSU

This CSU is the top level call to the recursive function `get_quad_nodes_internal`.

Parameters		
Parameters	Type	Where Typedef Declared
node	pointer to QUAD_NODE	Sec. 2.12.1.18
list	pointer to LIST	Sec. 2.12.1.18
qx	INT32	Sec. 2.12.1.18
qy	INT32	Sec. 2.12.1.18
size	INT32	Sec. 2.12.1.18
x_min	INT32	Sec. 2.12.1.18
y_min	INT32	Sec. 2.12.1.18
x_max	INT32	Sec. 2.12.1.18
y_max	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
get_quad_nodes_internal(...)	pointer to LIST	Function call.
Calls		
Function	Where Described	
get_quad_nodes_internal	Sec. 2.12.1.5.3	

Table 2.12-27: get\_quad\_nodes CSU [8.12.1.5.2]

### 2.12.1.5.3 get\_quad\_nodes\_internal CSU

This CSU recursively finds all of the quad tree nodes that a given area intersects.

Parameters		
Parameters	Type	Where Typedef Declared
node	pointer to register QUAD_NODE	Sec. 2.12.1.18
list	pointer to register LIST	Sec. 2.12.1.18
qx	register INT32	Sec. 2.12.1.18
qy	register INT32	Sec. 2.12.1.18
size	register INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
NULL_PTR	pointer to LIST	No node found.
list	pointer to register LIST	Successful.
Calls		
Function	Where Described	
valid_quad	Sec. 2.12.1.5.4	
push	Sec. 2.12.1.7.3	
get_quad_nodes_internal	Sec. 2.12.1.5.3	

Table 2.12-28: get\_quad\_nodes\_internals CSU [8.12.1.5.3]



#### 2.12.1.5.4 valid\_quad CSU

This CSU tests whether an area is totally within, totally without, or partially within a quad tree node, or whether a quad tree node is totally within or totally without a given area.

Parameters		
Parameters	Type	Where Typedef Declared
qx	register INT32	Sec. 2.12.1.18
qy	register INT32	Sec. 2.12.1.18
size	register INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
0	int	Area totally out of quad, or quad totally out of area.
1	int	Quad totally in area, or area totally in quad, or area partially in quad.

Table 2.12-29: valid\_quad CSU [8.12.1.5.4]

#### 2.12.1.6 print.c CSC

/simnet/libsrc/libquad/print.c

This CSC consists of a single CSU, print\_quad\_node.

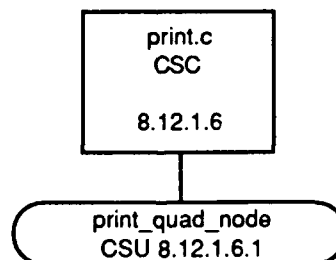


Figure 2.12-7: print.c CSC Structure

##### 2.12.1.6.1 print\_quad\_node CSU

This CSU prints a quad node, "Leaf Node". This information includes all water segments, water intersection indices, road segments, road intersection indices, bridge segments, and the child node.

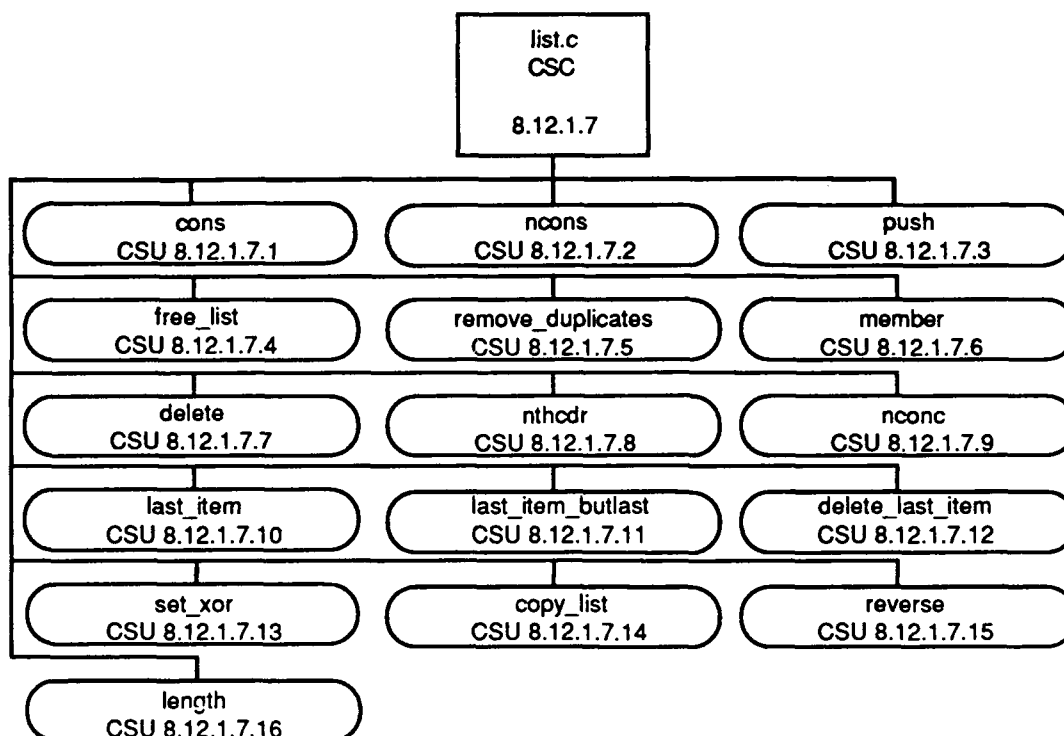
Parameters		
Parameters	Type	Where Typedef Declared
node_index	int	Standard

Table 2.12-30: print\_quad\_node CSU [8.12.1.6.1]

**2.12.1.7 list.c CSC**

/simnet/libsrc/libquad/list.c

This CSC contains CSUs that deal with LIST structures.

**Figure 2.12-8: list.c CSC Structure****2.12.1.7.1 cons CSU**

This CSU creates a new cons.

Parameters		
Parameters	Type	Where Typedef Declared
car	int	Standard
cdr	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
new_cons	pointer to LIST	New cons created.
Errors		
Error Name	Reason for Error	
Error: Can't allocate a cons	Unable to allocate space for a new cons.	

Calls	
Function	Where Described
heap_allocate	Sec. 2.14.2.1.1

Table 2.12-31: cons CSU [8.12.1.7.1]

## 2.12.1.7.2 ncons CSU

This CSU creates a new cons, with a cdr of nil.

Parameters		
Parameters	Type	Where Typedef Declared
car	int	Standard
ReturnValues		
Return Value	Type	Meaning
cons(car, NULL_PTR)	pointer to LIST	Function call to create a new cons.
Calls		
Function	Where Described	
cons	Sec. 2.12.1.7.1	

Table 2.12-32: ncons CSU [8.12.1.7.2]

## 2.12.1.7.3 push CSU

This CSU pushes an item onto the front of a list.

Parameters		
Parameters	Type	Where Typedef Declared
value	int	Standard
list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
list	pointer to LIST	The resulting list.
Calls		
Function	Where Described	
cons	Sec. 2.12.1.7.1	

Table 2.12-33: push CSU [8.12.1.7.3]

**2.12.1.7.4 free\_list CSU**

This CSU frees all of the cons on a list.

Parameters		
Parameters	Type	Where Typedef Declared
list	pointer to LIST	Sec. 2.12.1.18
Calls		
Function	Where Described	
free list	Sec. 2.12.1.7.4	
heap_deallocate	Sec. 2.14.2.1.4	

Table 2.12-34: free\_list CSU [8.12.1.7.4]

**2.12.1.7.5 remove\_duplicates CSU**

This CSU removes all duplicate items of a list, leaving only one instance of that item on the list.

Parameters		
Parameters	Type	Where Typedef Declared
list	pointer to LIST	Sec. 2.12.1.18
Calls		
Function	Where Described	
heap_deallocate	Sec. 2.14.2.1.4	
remove_duplicates	Sec. 2.12.1.7.5	

Table 2.12-35: remove\_duplicates CSU [8.12.1.7.5]

**2.12.1.7.6 member CSU**

This CSU determines if an item is a member of a list.

Parameters		
Parameters	Type	Where Typedef Declared
item	int	Standard
list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Item is a member of the list.
FALSE	int	Item is not a member of the list.

Table 2.12-36: member CSU [8.12.1.7.6]

**2.12.1.7.7 delete CSU**

This CSU deletes an item from a list.

Parameters		
Parameters	Type	Where Typedef Declared
item	int	Standard
list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
list	pointer to LIST	The resulting list.
Calls		
Function	Where Described	
heap_deallocate	Sec. 2.14.2.1.4	

Table 2.12-37: delete CSU [8.12.1.7.7]

**2.12.1.7.8 nthcdr CSU**

This CSU returns the portion of a list that starts at the nth cdr of the input list.

Parameters		
Parameters	Type	Where Typedef Declared
n	int	Standard
list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
cons	pointer to LIST	The resulting list.

Table 2.12-38: nthcdr CSU [8.12.1.7.8]

**2.12.1.7.9 nconc CSU**

This CSU appends one list on the end of another list.

Parameters		
Parameters	Type	Where Typedef Declared
list1	pointer to LIST	Sec. 2.12.1.18
list2	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
list1	pointer to LIST	list2 appended to list1.
list2	pointer to LIST	list1 empty.

Table 2.12-39: nconc CSU [8.12.1.7.9]

**2.12.1.7.10 last\_item CSU**

This CSU returns the last item of a list.

Parameters		
Parameters	Type	Where Typedef Declared
list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
NULL_PTR	pointer to LIST	List empty.
cons->car	pointer to LIST	Last list item.

**Table 2.12-40: last\_item CSU [8.12.1.7.10]**

**2.12.1.7.11 last\_item\_butlast CSU**

This CSU returns the second to the last item of a list.

Parameters		
Parameters	Type	Where Typedef Declared
list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
NULL_VAL	pointer to LIST	List empty.
list->car	pointer to LIST	Only one item in list; that item returned.
cons->car	pointer to LIST	Second from last item.

**Table 2.12-41: last\_item\_butlast CSU [8.12.1.7.11]**

**2.12.1.7.12 delete\_last\_item CSU**

This CSU deletes the last item of a list.

Parameters		
Parameters	Type	Where Typedef Declared
list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
NULL_PTR	pointer to LIST	List was empty; or list had only one item, which was deleted and the space deallocated.
list	pointer to LIST	Last item deleted.
Calls		
Function	Where Described	
heap_deallocate	Sec. 2.14.2.1.4	

**Table 2.12-42: delete\_last\_item CSU [8.12.1.7.12]**

**2.12.1.7.13 set\_xor CSU**

This CSU removes all duplicate items from two lists and returns a new list of all the items remaining in the two lists.

Parameters		
Parameters	Type	Where Typedef Declared
list1	pointer to LIST	Sec. 2.12.1.18
list2	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
list1	pointer to LIST	List 2 is null.
new_1	pointer to LIST	The resulting list.
Calls		
Function	Where Described	
copy_list	Sec. 2.12.1.7.14	
member	Sec. 2.12.1.7.6	
delete	Sec. 2.12.1.7.7	
nconc	Sec. 2.12.1.7.9	

Table 2.12-43: set\_xor CSU [8.12.1.7.13]

**2.12.1.7.14 copy\_list CSU**

This CSU copies a list, creating a new list.

Parameters		
Parameters	Type	Where Typedef Declared
list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
new	pointer to LIST	The new list.
Calls		
Function	Where Described	
nconc	Sec. 2.12.1.7.9	
ncons	Sec. 2.12.1.7.2	

Table 2.12-44: copy\_list CSU [8.12.1.7.14]

**2.12.1.7.15 reverse CSU**

This CSU returns a new list composed of the specified list in reverse order.

Parameters		
Parameters	Type	Where Typedef Declared
list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
new	pointer to LIST	The new list.
Calls		
Function	Where Described	
push	Sec. 2.12.1.7.3	

Table 2.12-45: reverse CSU [8.12.1.7.15]

**2.12.1.7.16 length CSU**

This CSU returns the number of items in a list.

Parameters		
Parameters	Type	Where Typedef Declared
list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
i	int	Number of items in the list.

Table 2.12-46: length CSU [8.12.1.7.16]

**2.12.1.8 water\_avoidance.c CSC**

/simnet/libsrc/libquad/water\_avoidance.c

This CSU contains CSUs that accomplish finding a suitable route, eliminating any route through impassable water.

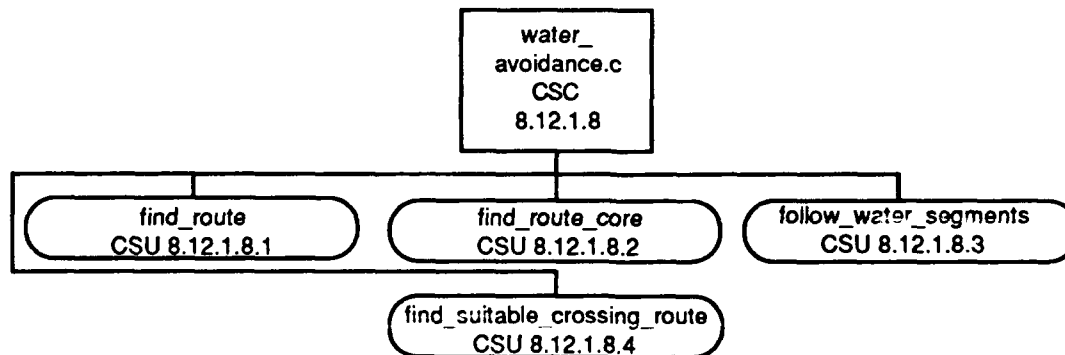


Figure 2.12-9: water\_avoidance.c CSC Structure



**2.12.1.8.1 find\_route CSU**

This CSU creates a new route that eliminates all unfordable water crossings along a given route.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
offset	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
new_route	pointer to LIST	New route found.
Calls		
Function	Where Described	
get_water_indecies	Sec. 2.12.1.4.1	
all_wide_segments_thru_water	Sec. 2.12.1.4.8	
free_list	Sec. 2.12.1.7.4	
find_route_core	Sec. 2.12.1.8.2	
nconc	Sec. 2.12.1.7.9	
FIRST	See Appendix A	
skirt_river_bend	Sec. 2.12.1.12.9	
skirt_lake	Sec. 2.12.1.12.7	
SECOND	See Appendix A	
heap_deallocate	Sec. 2.14.2.1.4	
print_route_list	Sec. 2.12.1.11.22	
last_item	Sec. 2.12.1.7.10	
push	Sec. 2.12.1.7.3	
get_quads_in_rt_point_region	Sec. 2.12.1.11.14	
final_relax_points	Sec. 2.12.1.11.12	
CDR	See Appendix A	
ncons	Sec. 2.12.1.7.2	

**Table 2.12-47: find\_route CSU [8.12.1.8.1]**

**2.12.1.8.2 find\_route\_core CSU**

This CSU recursively finds points to cross unfordable water crossed by a given line segment.

Parameters		
Parameters	Type	Where Typedef Declared
xy1	pointer to VECTOR 2D	Sec. 2.12.1.18
xy2	pointer to VECTOR 2D	Sec. 2.12.1.18
water_crossings	pointer to RIVER_SEG	Sec. 2.12.1.18
offset	INT32	Sec. 2.12.1.18
new_section	pointer to RIVER_SEG	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
NULL_PTR	pointer to LIST	No crossing exists.
new_section	pointer to LIST	Water crossing points.
Calls		
Function	Where Described	
FIRST	See Appendix A	
CDR	See Appendix A	
append_vector_2d_on_route	Sec. 2.12.1.11.19	
ODD_P	See Appendix A	
skirt_river_bend	Sec. 2.12.1.12.9	
skirt_lake	Sec. 2.12.1.12.7	
SECOND	See Appendix A	
intersection_direction	Sec. 2.12.1.11.2	
follow_water_segments	Sec. 2.12.1.8.3	
free_list	Sec. 2.12.1.7.4	
length	Sec. 2.12.1.7.16	
free_crossings	Sec. 2.12.1.11.20	
find_closer_crossing	Sec. 2.12.1.11.7	
push_vector_2d_on_points	Sec. 2.12.1.11.17	
crossing_location	Sec. 2.12.1.11.9	
get_quads_in_region	Sec. 2.12.1.11.13	
find_suitable_crossing_route	Sec. 2.12.1.8.4	

**Table 2.12-48: find\_route\_core CSU [8.12.1.8.2]**

**2.12.1.8.3 follow\_water\_segments CSU**

This CSU recursively follows the river network looking for bridges, fordable segments, or ends of river segments.

Parameters		
Parameters	Type	Where Typedef Declared
int index	int	Standard
water index	int	Standard
direction	int	Standard
level	int	Standard
segment list	pointer to LIST	Sec. 2.12.1.18
offset	int	Standard
water crossings	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
water crossings	pointer to LIST	The water crossings found.
Calls		
Function	Where Described	
member	Sec. 2.12.1.7.6	
nconc	Sec. 2.12.1.7.9	
ncons	Sec. 2.12.1.7.2	
push	Sec. 2.12.1.7.3	
heap allocate	Sec. 2.14.2.1.1	
follow water segments	Sec. 2.12.1.8.3	
free list	Sec. 2.12.1.7.4	
free crossings	Sec. 2.12.1.11.20	

**Table 2.12-49: follow\_water\_segments CSU [8.12.1.8.3]**

**2.12.1.8.4 find\_suitable\_crossing\_route CSU**

This CSU generates the route points necessary to read a water crossing point, skirting river bends or lakes.

Parameters		
Parameters	Type	Where Typedef Declared
start	pointer to VECTOR 2D	Sec. 2.12.1.18
destination	pointer to VECTOR 2D	Sec. 2.12.1.18
next crossing	pointer to RIVER CROSSING	Sec. 2.12.1.18
last crossing	pointer to RIVER CROSSING	Sec. 2.12.1.18
rest crossings	pointer to LIST	Sec. 2.12.1.18
prev segment list	pointer to LIST	Sec. 2.12.1.18
new section	pointer to LIST	Sec. 2.12.1.18
direction	int	Standard
offset	int	Standard

ReturnValues		
Return Value	Type	Meaning
new_section	pointer to LIST	Route points.
Calls		
Function	Where Described	
all_wide_segments_thru_water	Sec. 2.12.1.4.8	
FIRST	See Appendix A	
skirt_river	Sec. 2.12.1.12.1	
skirt_lake	Sec. 2.12.1.12.7	
SECOND	See Appendix A	
extend_crossing	Sec. 2.12.1.10.1	
rt_point_to_vector	Sec. 2.12.1.11.21	
reverse	Sec. 2.12.1.7.15	
set_xor	Sec. 2.12.1.7.13	
copy_list	Sec. 2.12.1.7.14	
nconc	Sec. 2.12.1.7.9	
last_item	Sec. 2.12.1.7.10	
find_suitable_crossing_route	Sec. 2.12.1.8.4	
CDR	See Appendix A	
free_list	Sec. 2.12.1.7.4	
heap_deallocate	Sec. 2.14.2.1.4	

Table 2.12-50: find\_suitable\_crossing\_route CSU [8.12.1.8.4]

### 2.12.1.9 vector\_2d.c CSC

/simnet/libsrc/libquad/vector\_2d.c

This CSC contains CSUs that deal with two-dimensional vectors, each consisting of a single x,y pair.

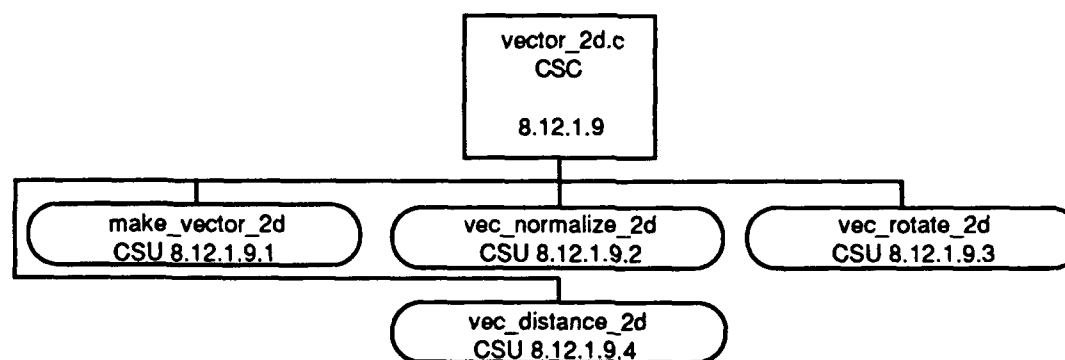


Figure 2.12-10: vector\_2d.c CSC Structure

**2.12.1.9.1 make\_vector\_2d CSU**

This CSU allocates memory for a vector, if available, and sets the vector's values to the passed parameters.

Parameters		
Parameters	Type	Where Typedef Declared
x	double	Standard
y	double	Standard
ReturnValues		
Return Value	Type	Meaning
vector	pointer to VECTOR_2D	Pointer to vector.
Errors		
Error Name	Reason for Error	
Can't allocate new vector	Unable to allocate memory for new vector.	
Calls		
Function	Where Described	
heap_allocate	Sec. 2.14.2.1.1	

Table 2.12-51: make\_vector\_2d CSU [8.12.1.9.1]

**2.12.1.9.2 vec\_normalize\_2d CSU**

This CSU normalizes the first input vector, and places the result in the second input vector.

Parameters		
Parameters	Type	Where Typedef Declared
a	pointer to VECTOR_2D	Sec. 2.12.1.18
b	pointer to VECTOR_2D	Sec. 2.12.1.18

Table 2.12-52: vec\_normalize\_2d CSU [8.12.1.9.2]

**2.12.1.9.3 vec\_rotate\_2d CSU**

This CSU rotates vector *a* by *angle*, and places the result in vector *b*.

Parameters		
Parameters	Type	Where Typedef Declared
a	pointer to VECTOR_2D	Sec. 2.12.1.18
b	pointer to VECTOR_2D	Sec. 2.12.1.18
angle	double	Standard

Table 2.12-53: vec\_rotate\_2d CSU [8.12.1.9.3]

#### 2.12.1.9.4 vec\_distance\_2d CSU

This CSU returns the distance between the end points of two normalized vectors.

Parameters		
Parameters	Type	Where Typedef Declared
a	pointer to VECTOR 2D	Sec. 2.12.1.18
b	pointer to VECTOR 2D	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
$\sqrt{dx*dx + dy*dy}$	double	Square root of the sum of the squares of the vector differences.

Table 2.12-54: vec\_distance\_2d CSU [8.12.1.9.4]

#### 2.12.1.10 extend\_crossings.c CSC

/simnet/libsrc/libquad/extend\_crossings.c

This CSC contains CSUs that deal with the extension of crossing routes.

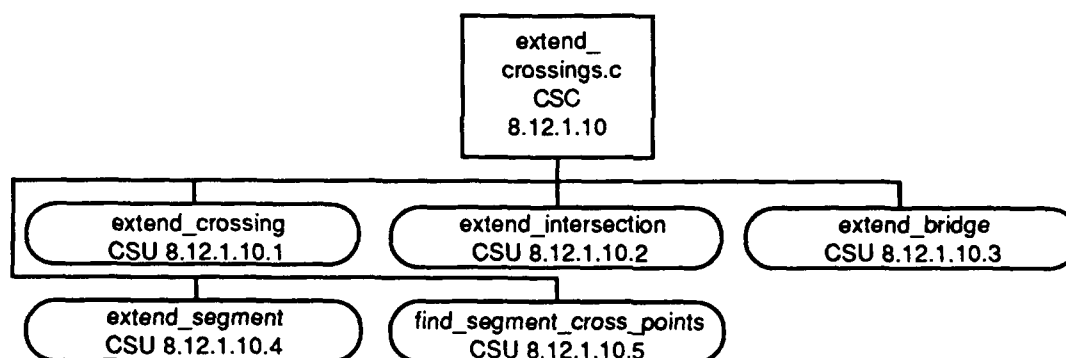


Figure 2.12-11: extend\_crossings.c CSC Structure

##### 2.12.1.10.1 extend\_crossing CSU

This CSU calls the appropriate routine to extend a river crossing point, in order to facilitate crossing at that point.

Parameters		
Parameters	Type	Where Typedef Declared
crossing	pointer to RIVER_CROSSING	Sec. 2.12.1.18
direction	int	Standard
offset	int	Standard
extended_crossing	pointer to LIST	Sec. 2.12.1.18

ReturnValues		
Return Value	Type	Meaning
extended_crossing	pointer to LIST	Pointer to extended crossing type.
Calls		
Function	Where Described	
extend_bridge	Sec. 2.12.1.10.3	
extend_intersection	Sec. 2.12.1.10.2	
extend_segment	Sec. 2.12.1.10.4	

Table 2.12-55: extend\_crossing CSU [8.12.1.10.1]

## 2.12.1.10.2 extend\_intersection CSU

This CSU extends the end of a river segment.

Parameters		
Parameters	Type	Where Typedef Declared
intersection	pointer to RIVER_INT	Sec. 2.12.1.18
direction	int	Standard
offset	int	Standard
extended_crossing	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
extended_crossing	pointer to LIST	The extended river segment.
Calls		
Function	Where Described	
find next point	Sec. 2.12.1.11.8	
VEC SUB 2D	See Appendix A	
vec normalize 2d	Sec. 2.12.1.9.2	
VEC SCALE 2D	See Appendix A	
vec rotate 2d	Sec. 2.12.1.9.3	
VEC ADD 2D	See Appendix A	
push vector 2d on route	Sec. 2.12.1.11.18	

Table 2.12-56: extend\_intersection CSU [8.12.1.10.2]

**2.12.1.10.3      extend\_bridge CSU**

This CSU extends a bridge crossing point.

Parameters		
Parameters	Type	Where Typedef Declared
bridge	pointer to BRIDGE	Sec. 2.12.1.18
direction	int	Standard
offset	int	Standard
segment_list	pointer to LIST	Sec. 2.12.1.18
extended_crossing	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
extended_crossing	pointer to LIST	The extended crossing point.
Calls		
Function	Where Described	
last item	Sec. 2.12.1.7.10	
find next point	Sec. 2.12.1.11.8	
VEC SUB 2D	See Appendix A	
vec normalize 2d	Sec. 2.12.1.9.2	
VEC SCALE 2D	Sec. 2.12.1.18	
find first vector	Sec. 2.12.1.11.5	
VEC ADD 2D	See Appendix A	
push vector 2d on route	Sec. 2.12.1.11.18	

**Table 2.12-57:    extend\_bridge CSU [8.12.1.10.3]**

**2.12.1.10.4      extend\_segment CSU**

This CSU extends a fordable river segment.

Parameters		
Parameters	Type	Where Typedef Declared
segment	pointer to RIVER_SEG	Sec. 2.12.1.18
segment_list	pointer to LIST	Sec. 2.12.1.18
direction	int	Standard
offset	int	Standard
extended_crossing	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
extended_crossing	pointer to LIST	The extended fordable river segment.



Calls	
Function	Where Described
find segment cross points	Sec. 2.12.1.10.5
last item butlast	Sec. 2.12.1.7.11
VEC SUB 2D	See Appendix A
vec rotate 2d	Sec. 2.12.1.9.3
vec normalize 2d	Sec. 2.12.1.9.2
VEC SCALE 2D	See Appendix A
find first vector	Sec. 2.12.1.11.5
VEC ADD 2D	See Appendix A
push vector 2d on route	Sec. 2.12.1.11.18

Table 2.12-58: extend\_segment CSU [8.12.1.10.4]

## 2.12.1.10.5 find\_segment\_cross\_points CSU

This CSU finds two points that form a line perpendicular to a line segment at a distance offset from one end.

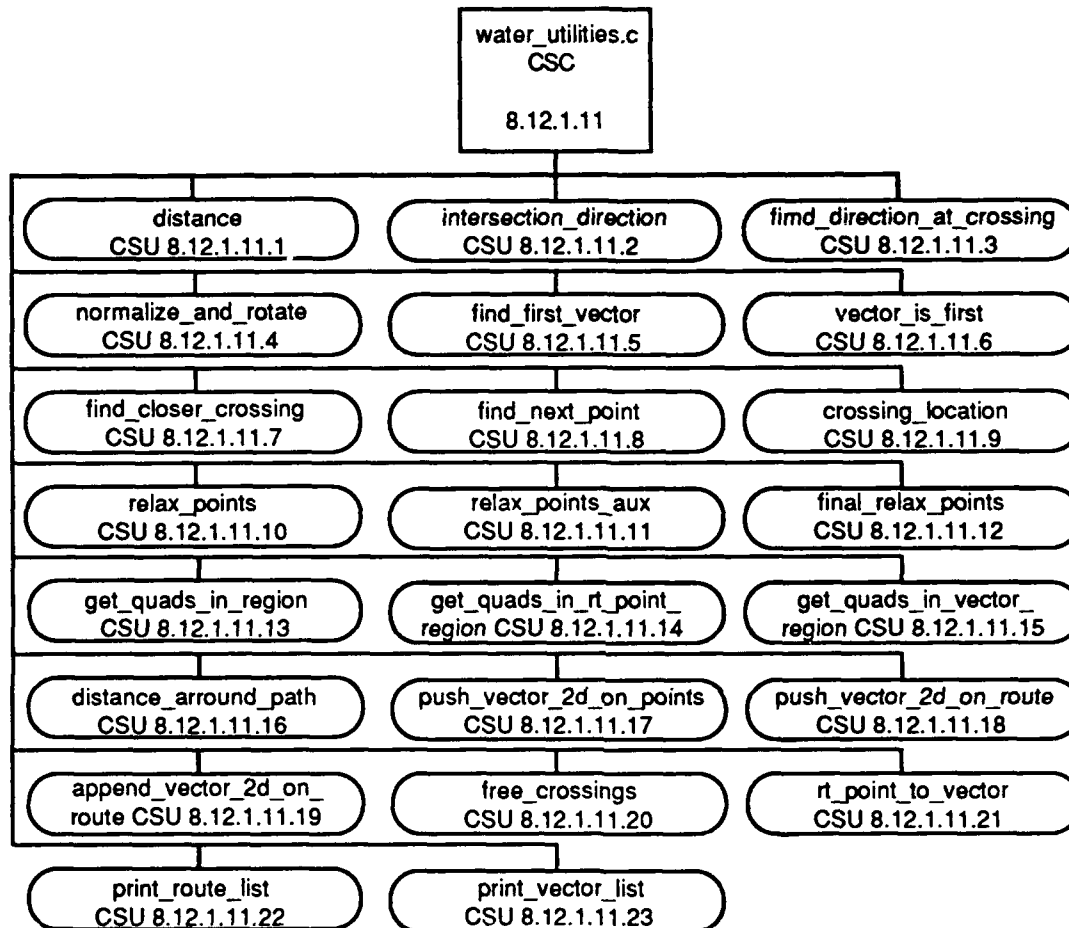
Parameters		
Parameters	Type	Where Typedef Declared
segment	pointer to RIVER_SEG	Sec. 2.12.1.18
prev_segment_index	int	Standard
offset	int	Standard
cross1	pointer to VECTOR 2D	Sec. 2.12.1.18
cross2	pointer to VECTOR 2D	Sec. 2.12.1.18
Calls		
Function	Where Described	
distance	SEC. 2.12.1.11.1	
VEC SUB 2D	See Appendix A	
VEC SCALE 2D	See Appendix A	

Table 2.12-59: find\_segment\_cross\_points CSU [8.12.1.10.5]

**2.12.1.11 water\_utilities.c CSC**

/simnet/libsrc/libquad/water\_utilities.c

This CSC contains CSUs dealing with water crossing and intersection.

**Figure 2.12-12: water\_utilities.c CSC Structure****2.12.1.11.1 distance CSU**

This CSU calculates the distance between two points.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18

ReturnValues		
Return Value	Type	Meaning
$\text{sqrt}(\text{dx}^2 + \text{dy}^2)$	double	Square root of the sum of the squares of the vector differences.

Table 2.12-60: distance CSU [8.12.1.11.1]

## 2.12.1.11.2 intersection\_direction CSU

This CSU determines whether the tributaries of a river should be searched in clockwise or counterclockwise order.

Parameters		
Parameters	Type	Where Typedef Declared
origin	pointer to VECTOR_2D	Sec. 2.12.1.18
water	pointer to WATER_INT	Sec. 2.12.1.18
int_index	int	Standard
Calls		
Function	Where Described	
find_direction_at_crossing	Sec. 2.12.1.11.3	

Table 2.12-61: intersection\_direction CSU [8.12.1.11.2]

## 2.12.1.11.3 find\_direction\_at\_crossing CSU

This CSU determines whether a set of points form a clockwise or a counterclockwise angle.

Parameters		
Parameters	Type	Where Typedef Declared
points	pointer to INT32	Sec. 2.12.1.18
num_pts	int	Standard
reversed	int	Standard
origin	pointer to VECTOR_2D	Sec. 2.12.1.18
water	pointer to WATER_INT	Sec. 2.12.1.18
pt_direction	int	Standard
ReturnValues		
Return Value	Type	Meaning
CLOCKWISE	int	Direction
ANTICLOCKWISE	int	Direction
Calls		
Function	Where Described	
VEC SUB 2D	See Appendix A	
normalize and rotate	Sec. 2.12.1.11.4	
VEC ANGLE 2D	See Appendix A	

Table 2.12-62: find\_direction\_at\_crossing CSU [8.12.1.11.3]

**2.12.1.11.4      normalize\_and\_rotate CSU**

This CSU normalizes a vector and rotates it.

Parameters		
Parameters	Type	Where Typedef Declared
origin	pointer to VECTOR 2D	Sec. 2.12.1.18
a	pointer to VECTOR 2D	Sec. 2.12.1.18
b	pointer to VECTOR 2D	Sec. 2.12.1.18
result	pointer to VECTOR 2D	Sec. 2.12.1.18
Calls		
Function	Where Described	
VEC SUB 2D	See Appendix A	
vec_normalize 2d	Sec. 2.12.1.9.2	
VEC ANGLE 2D	See Appendix A	
vec_rotate 2d	Sec. 2.12.1.9.3	

**Table 2.12-63:    normalize\_and\_rotate CSU [8.12.1.11.4]**

**2.12.1.11.5      find\_first\_vector CSU**

This CSU returns the first vector found by rotating the origin vector in the given direction.

Parameters		
Parameters	Type	Where Typedef Declared
origin	pointer to VECTOR 2D	Sec. 2.12.1.18
a	pointer to VECTOR 2D	Sec. 2.12.1.18
b	pointer to VECTOR 2D	Sec. 2.12.1.18
direction	int	Standard
ReturnValues		
Return Value	Type	Meaning
vector_is_first(...)	pointer to VECTOR 2D	Found vector.
Calls		
Function	Where Described	
VEC ANGLE 2D	See Appendix A	
vec_rotate 2d	Sec. 2.12.1.9.3	
vector_is_first	Sec. 2.12.1.11.6	

**Table 2.12-64:    find\_first\_vector CSU [8.12.1.11.5]**

**2.12.1.11.6 vector\_is\_first CSU**

This CSU determines whether the first angle is smaller than the second angle in the direction given.

Parameters		
Parameters	Type	Where Typedef Declared
angle1	double	Standard
angle2	double	Standard
direction	int	Standard
ReturnValues		
Return Value	Type	Meaning
TRUE	int	First angle is smaller than the second angle.
FALSE	int	First angle is not smaller than the second angle.

Table 2.12-65: vector\_is\_first CSU [8.12.1.11.6]

**2.12.1.11.7 find\_closer\_crossing CSU**

This CSU calculates the distances from a point to two crossing points, and returns the closest crossing point.

Parameters		
Parameters	Type	Where Typedef Declared
xy	pointer to VECTOR_2D	Sec. 2.12.1.18
crossings_1	pointer to LIST	Sec. 2.12.1.18
crossings_2	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
crossings_1	pointer to LIST	The first crossing point is the closest .
crossings_2	pointer to LIST	The second crossing point is the closest .
Calls		
Function	Where Described	
crossing location	Sec. 2.12.1.11.9	
FIRST	See Appendix A	
vec distance 2d	Sec. 2.12.1.9.4	

Table 2.12-66: find\_closer\_crossing CSU [8.12.1.11.7]

**2.12.1.11.8 find\_next\_point CSU**

This CSU finds the next point in a point list from an intersection point.

Parameters		
Parameters	Type	Where Typedef Declared
int_vec	pointer to VECTOR_2D	Sec. 2.12.1.18
return_vec	pointer to VECTOR_2D	Sec. 2.12.1.18
points	pointer to INT32	Sec. 2.12.1.18
num_pts	int	Standard

**Table 2.12-67: find\_next\_point CSU [8.12.1.11.8]**

**2.12.1.11.9 crossing\_location CSU**

This CSU returns the location of a water crossing point.

Parameters		
Parameters	Type	Where Typedef Declared
crossing	pointer to RIVER_CROSSING	Sec. 2.12.1.18
vector	pointer to VECTOR_2D	Sec. 2.12.1.18
Calls		
Function	Where Described	
last_item	Sec. 2.12.1.7.10	
length	Sec. 2.12.1.7.16	
last_item_butlast	Sec. 2.12.1.7.11	

**Table 2.12-68: crossing\_location CSU [8.12.1.11.9]**

**2.12.1.11.10 relax\_points CSU**

This CSU eliminates route points such that the resulting route does not cross any unfordable water.

Parameters		
Parameters	Type	Where Typedef Declared
start	pointer to VECTOR_2D	Sec. 2.12.1.18
destination	pointer to VECTOR_2D	Sec. 2.12.1.18
river_points	pointer to LIST	Sec. 2.12.1.18
offset	int	Standard
ReturnValues		
Return Value	Type	Meaning
river_points	pointer to LIST	Resulting route.

Calls	
Function	Where Described
nconc	Sec. 2.12.1.7.9
ncons	Sec. 2.12.1.7.2
get quads in vector region	Sec. 2.12.1.11.15
delete last item	Sec. 2.12.1.7.12
relax points aux	Sec. 2.12.1.11.11
CDR	See Appendix A
last item	Sec. 2.12.1.7.10

Table 2.12-69: relax\_points CSU [8.12.1.11.10]

## 2.12.1.11.11 relax\_points\_aux CSU

This CSU removes points from a point list, checking if the resulting list crosses any unfordable water.

Parameters		
Parameters	Type	Where Typedef Declared
start	pointer to VECTOR 2D	Sec. 2.12.1.18
points	pointer to LIST	Sec. 2.12.1.18
offset	int	Standard
ReturnValues		
Return Value	Type	Meaning
ncons(start)	pointer to LIST	The list is empty.
new_points	pointer to LIST	The resulting point list.
Calls		
Function	Where Described	
ncons	Sec. 2.12.1.7.2	
reverse	Sec. 2.12.1.7.15	
any_wide_segment_thru_water	Sec. 2.12.1.4.3	
heap_deallocate	Sec. 2.14.2.1.4	
push	Sec. 2.12.1.7.3	
free_list	Sec. 2.12.1.7.4	
nconc	Sec. 2.12.1.7.9	
relax_points	Sec. 2.12.1.11.10	

Table 2.12-70: relax\_points\_aux CSU [8.12.1.11.11]

**2.12.1.11.12 final\_relax\_points CSU**

This CSU removes points from a point list, checking if the resulting list crosses any unfordable water. It does not remove bridge points, however.

Parameters		
Parameters	Type	Where Typedef Declared
start	pointer to VECTOR 2D	Sec. 2.12.1.18
points	pointer to LIST	Sec. 2.12.1.18
offset	int	Standard
ReturnValues		
Return Value	Type	Meaning
ncons(start)	pointer to LIST	The list is empty.
new_points	pointer to LIST	The resulting point list.
Calls		
Function	Where Described	
ncons	Sec. 2.12.1.7.2	
reverse	Sec. 2.12.1.7.15	
any_wide_segment_thru_water	Sec. 2.12.1.4.3	
heap_deallocate	Sec. 2.14.2.1.4	
push	Sec. 2.12.1.7.3	
free list	Sec. 2.12.1.7.4	
nconc	Sec. 2.12.1.7.9	
final_relax_points	Sec. 2.12.1.11.12	
CDR	See Appendix A	

**Table 2.12-71: final\_relax\_points CSU [8.12.1.11.12]**

**2.12.1.11.13 get\_quads\_in\_region CSU**

This CSU returns all of the water indices within a bounding box around a river segment.

Parameters		
Parameters	Type	Where Typedef Declared
points	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
get_water_indicies(...)	pointer to LIST	Resulting water indices.
Calls		
Function	Where Described	
CDDR	See Appendix A	
get_water_indicies	Sec. 2.12.1.4.1	

**Table 2.12-72: get\_quads\_in\_region CSU [8.12.1.11.13]**



**2.12.1.11.14      get\_quads\_in\_rt\_point\_region CSU**

This CSU returns all of the water indices within a bounding box around a route.

Parameters		
Parameters	Type	Where Typedef Declared
rt_points	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
get_water_indices(...)	pointer to LIST	Resulting water indices.
Calls		
Function	Where Described	
get_water_indices	Sec. 2.12.1.4.1	

**Table 2.12-73:    get\_quads\_in\_rt\_point\_region CSU [8.12.1.11.14]**

**2.12.1.11.15      get\_quads\_in\_vector\_region CSU**

This CSU returns all of the water indices within a bounding box around a list of connected vectors.

Parameters		
Parameters	Type	Where Typedef Declared
vectors	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
get_water_indices(...)	pointer to LIST	Resulting water indices.
Calls		
Function	Where Described	
get_water_indices	Sec. 2.12.1.4.1	

**Table 2.12-74:    get\_quads\_in\_vector\_region CSU [8.12.1.11.15]**

**2.12.1.11.16      distance\_around\_path CSU**

This CSU returns the distance of all of the segments in a list of connected vectors.

Parameters		
Parameters	Type	Where Typedef Declared
vectors	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
0	int	Empty list.
sum/count	int	Distance.

Calls	
Function	Where Described
vec_distance_2d	Sec. 2.12.1.9.4
FIRST	See Appendix A
SECOND	See Appendix A

Table 2.12-75: distance\_around\_path CSU [8.12.1.11.16]

## 2.12.1.11.17 push\_vector\_2d\_on\_points CSU

This CSU converts a vector to an x-y point and pushes it onto a point list.

Parameters		
Parameters	Type	Where Typedef Declared
vector	pointer to VECTOR_2D	Sec. 2.12.1.18
points	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
points	pointer to LIST	Point list.
Calls		
Function	Where Described	
push	Sec. 2.12.1.7.3	

Table 2.12-76: push\_vector\_2d\_on\_points CSU [8.12.1.11.17]

## 2.12.1.11.18 push\_vector\_2d\_on\_route CSU

This CSU converts a vector to a route point and pushes it onto a route.

Parameters		
Parameters	Type	Where Typedef Declared
vector	pointer to VECTOR_2D	Sec. 2.12.1.18
type	int	Standard
route	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
route	pointer to LIST	Resulting route.
Calls		
Function	Where Described	
heap_allocate	Sec. 2.14.2.1.1	
push	Sec. 2.12.1.7.3	

Table 2.12-77: push\_vector\_2d\_on\_route CSU [8.12.1.11.18]

**2.12.1.11.19      append\_vector\_2d\_on\_route CSU**

This CSU converts a vector to a route point and appends it to the end of a route.

Parameters		
Parameters	Type	Where Typedef Declared
vector	pointer to VECTOR 2D	Sec. 2.12.1.18
type	int	Standard
route	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
route	pointer to LIST	Resulting route.
Calls		
Function	Where Described	
heap_allocate	Sec. 2.14.2.1.1	
nconc	Sec. 2.12.1.7.9	
ncons	Sec. 2.12.1.7.2	

Table 2.12-78:    **append\_vector\_2d\_on\_route CSU [8.12.1.11.19]**

**2.12.1.11.20      free\_crossings CSU**

This CSU frees a list of river crossings.

Parameters		
Parameters	Type	Where Typedef Declared
crossings	pointer to LIST	Sec. 2.12.1.18
Calls		
Function	Where Described	
free_list	Sec. 2.12.1.7.4	
heap_deallocate	Sec. 2.14.2.1.4	

Table 2.12-79:    **free\_crossings CSU [8.12.1.11.20]**

**2.12.1.11.21      rt\_point\_to\_vector CSU**

This CSU converts a route point to a vector.

Parameters		
Parameters	Type	Where Typedef Declared
rt_point	pointer to ROUTE_PT	Sec. 2.12.1.18
vector	pointer to VECTOR 2D	Sec. 2.12.1.18

Table 2.12-80:    **rt\_point\_to\_vector CSU [8.12.1.11.21]**

**2.12.1.11.22 print\_route\_list CSU**

This CSU prints a list of route points.

Parameters		
Parameters	Type	Where Typedef Declared
route	pointer to LIST	Sec. 2.12.1.18

**Table 2.12-81: print\_route\_list CSU [8.12.1.11.22]**

**2.12.1.11.23 print\_vector\_list CSU**

This CSU prints a list of vectors.

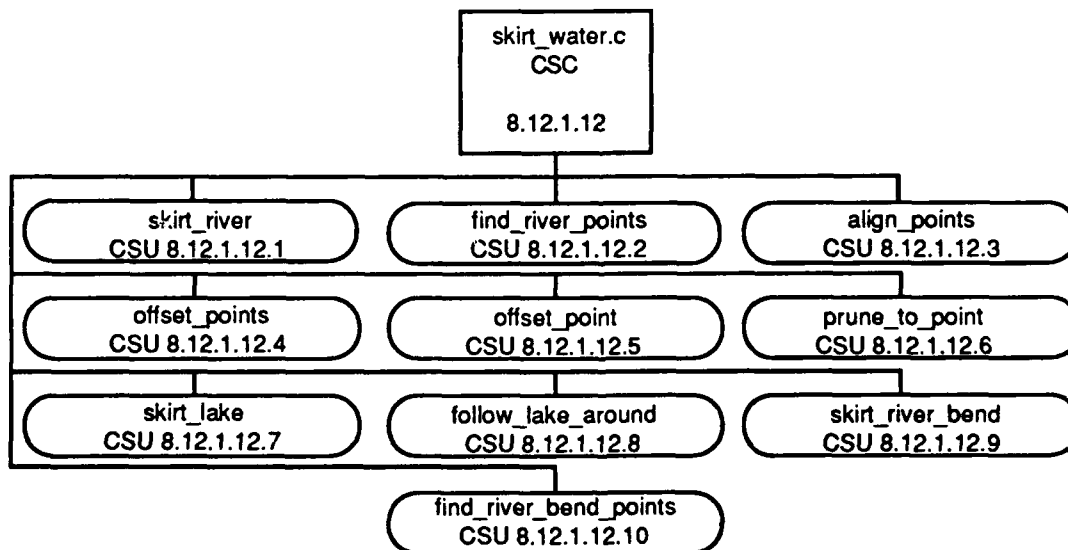
Parameters		
Parameters	Type	Where Typedef Declared
route	pointer to LIST	Sec. 2.12.1.18

**Table 2.12-82: print\_vector\_list CSU [8.12.1.11.23]**

**2.12.1.12 skirt\_water.c CSC**

/simnet/libsrc/libquad/skirt\_water.c

This CSC contains CSUs that deal with traveling around impassable water.



**Figure 2.12-13: skirt\_water.c CSC Structure**

**2.12.1.12.1 skirt\_river CSU**

This CSU calculates the route to skirt a river segment by following a route parallel to the river.

Parameters		
Parameters	Type	Where Typedef Declared
start	pointer to VECTOR 2D	Sec. 2.12.1.18
destination	pointer to VECTOR 2D	Sec. 2.12.1.18
crossing	pointer to RIVER CROSSING	Sec. 2.12.1.18
last_crossing	pointer to RIVER CROSSING	Sec. 2.12.1.18
segment_list	pointer to LIST	Sec. 2.12.1.18
direction	int	Standard
offset	int	Standard
new_section	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
new_section	pointer to LIST	Resulting route.
Calls		
Function	Where Described	
find_river_points	Sec. 2.12.1.12.2	
prune to point	Sec. 2.12.1.12.6	
length	Sec. 2.12.1.7.16	
offset_points	Sec. 2.12.1.12.4	
ncons	Sec. 2.12.1.7.2	
nconc	Sec. 2.12.1.7.9	
relax_points	Sec. 2.12.1.11.10	
append_vector_2d_on_route	Sec. 2.12.1.11.19	
heap_deallocate	Sec. 2.14.2.1.4	
free_list	Sec. 2.12.1.7.4	

**Table 2.12-83: skirt\_river CSU [8.12.1.12.1]**

**2.12.1.12.2 find\_river\_points CSU**

This CSU finds the river segment points between a line segment intersection and a river intersection.

Parameters		
Parameters	Type	Where Typedef Declared
segment_list	pointer to LIST	Sec. 2.12.1.18
crossing	pointer to RIVER CROSSING	Sec. 2.12.1.18
last_crossing	pointer to RIVER CROSSING	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
align_points(...)	pointer to LIST	Empty river segment list.
river_points	pointer to LIST	Resulting river segment points

Calls	
Function	Where Described
FIRST	See Appendix A
CDR	See Appendix A
crossing location	Sec. 2.12.1.11.9
align points	Sec. 2.12.1.12.3
SECOND	See Appendix A
nconc	Sec. 2.12.1.7.9

Table 2.12-84: find\_river\_points CSU [8.12.1.12.2]

## 2.12.1.12.3 align\_points CSU

This CSU returns a list of vectors, generated from a point list, that point in a given direction.

Parameters		
Parameters	Type	Where Typedef Declared
points	pointer to INT32	Sec. 2.12.1.18
num_pts	int	Standard
loc_vec	pointer to VECTOR_2D	Sec. 2.12.1.18
direction	int	Standard
ReturnValues		
Return Value	Type	Meaning
NULL_PTR	pointer to LIST	No vectors generated.
river_points	pointer to LIST	Resulting list.
Calls		
Function	Where Described	
push	Sec. 2.12.1.7.3	
make vector 2d	Sec. 2.12.1.9.1	

Table 2.12-85: align\_points CSU [8.12.1.12.3]

## 2.12.1.12.4 offset\_points CSU

This CSU calculates a set of points that are offset from the input points, based on the input direction.

Parameters		
Parameters	Type	Where Typedef Declared
points	pointer to LIST	Sec. 2.12.1.18
origin	pointer to VECTOR_2D	Sec. 2.12.1.18
offset	int	Standard
direction	int	Standard

Calls	
Function	Where Described
FIRST	See Appendix A
SECOND	See Appendix A
VEC SUB 2D	See Appendix A
VEC ADD 2D	See Appendix A
offset_point	Sec. 2.12.1.12.5

Table 2.12-86: offset\_points CSU [8.12.1.12.4]

## 2.12.1.12.5 offset\_point CSU

This CSU offsets a point by calculating a perpendicular vector from that point, based on the preceding and following points.

Parameters		
Parameters	Type	Where Typedef Declared
p1	pointer to VECTOR 2D	Sec. 2.12.1.18
p2	pointer to VECTOR 2D	Sec. 2.12.1.18
p3	pointer to VECTOR 2D	Sec. 2.12.1.18
direction	int	Standard
offset	int	Standard
Calls		
Function	Where Described	
VEC SUB 2D	See Appendix A	
vec normalize 2d	Sec. 2.12.1.9.2	
VEC ANGLE 2D	See Appendix A	
vec rotate 2d	Sec. 2.12.1.9.3	
find first vector	Sec. 2.12.1.11.5	
VEC SCALE 2D	See Appendix A	
VEC ADD 2D	See Appendix A	

Table 2.12-87: offset\_point CSU [8.12.1.12.5]

## 2.12.1.12.6 prune\_to\_point CSU

This CSU returns a list of points, starting with the point closest to the origin point.

Parameters		
Parameters	Type	Where Typedef Declared
points	pointer to LIST	Sec. 2.12.1.18
origin	pointer to VECTOR 2D	Sec. 2.12.1.18
direction	int	Standard
ReturnValues		
Return Value	Type	Meaning
points	pointer to LIST	Resulting list of points.

Calls	
Function	Where Described
vec distance 2d	Sec. 2.12.1.9.4
nthcdr	Sec. 2.12.1.7.8
heap_deallocate	Sec. 2.14.2.1.4

Table 2.12-88: prune\_to\_point CSU [8.12.1.12.6]

## 2.12.1.12.7 skirt\_lake CSU

This CSU calculates a route around a lake.

Parameters		
Parameters	Type	Where Typedef Declared
start	pointer to VECTOR 2D	Sec. 2.12.1.18
lake list	pointer to WATER_INT	Sec. 2.12.1.18
next list	pointer to WATER_INT	Sec. 2.12.1.18
offset	int	Standard
new_section	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
NULL_PTR	pointer to LIST	There is no lake.
new_section	pointer to LIST	Resulting route.
Calls		
Function	Where Described	
offset point	Sec. 2.12.1.12.5	
follow lake around	Sec. 2.12.1.12.8	
distance around path	Sec. 2.12.1.11.16	
heap_deallocate	Sec. 2.14.2.1.4	
free list	Sec. 2.12.1.7.4	
append vector 2d on route	Sec. 2.12.1.11.19	

Table 2.12-89: skirt\_lake CSU [8.12.1.12.7]

## 2.12.1.12.8 follow\_lake\_around CSU

This CSU generates the route points to follow around a lake.

Parameters		
Parameters	Type	Where Typedef Declared
start	pointer to VECTOR 2D	Sec. 2.12.1.18
dest	pointer to VECTOR 2D	Sec. 2.12.1.18
lake	pointer to LAKE	Sec. 2.12.1.18
min_start	int	Standard
min_dest	int	Standard
increment	int	Standard
offset	int	Standard



ReturnValues		
Return Value	Type	Meaning
new_points	pointer to LIST	Resulting list of route points.
Calls		
Function	Where Described	
nconc	Sec. 2.12.1.7.9	
ncons	Sec. 2.12.1.7.2	
make_vector_2d	Sec. 2.12.1.9.1	
offset_points	Sec. 2.12.1.12.4	
relax_points	Sec. 2.12.1.11.10	

Table 2.12-90: follow\_lake\_around CSU [8.12.1.12.8]

## 2.12.1.12.9 skirt\_river\_bend CSU

This CSU calculates a route around a river bend.

Parameters		
Parameters	Type	Where Typedef Declared
start	pointer to VECTOR_2D	Sec. 2.12.1.18
destination	pointer to VECTOR_2D	Sec. 2.12.1.18
water_crossings	pointer to LIST	Sec. 2.12.1.18
new_section	pointer to LIST	Sec. 2.12.1.18
offset	int	Standard
ReturnValues		
Return Value	Type	Meaning
new_section	pointer to LIST	Resulting route.
Calls		
Function	Where Described	
FIRST	See Appendix A	
reverse	Sec. 2.12.1.7.15	
free_list	Sec. 2.12.1.7.4	
find_river_bend_points	Sec. 2.12.1.12.10	
find_direction_at_crossing	Sec. 2.12.1.11.3	
prune_to_point	Sec. 2.12.1.12.6	
length	Sec. 2.12.1.7.16	
offset_points	Sec. 2.12.1.12.4	
nconc	Sec. 2.12.1.7.9	
ncons	Sec. 2.12.1.7.2	
relax_points	Sec. 2.12.1.11.10	
append_vector_2d_on_route	Sec. 2.12.1.11.19	
heap_deallocate	Sec. 2.14.2.1.4	

Table 2.12-91: skirt\_river\_bend CSU [8.12.1.12.9]

**2.12.1.12.10 find\_river\_bend\_points CSU**

This CSU returns the list of river segment points between two intersections.

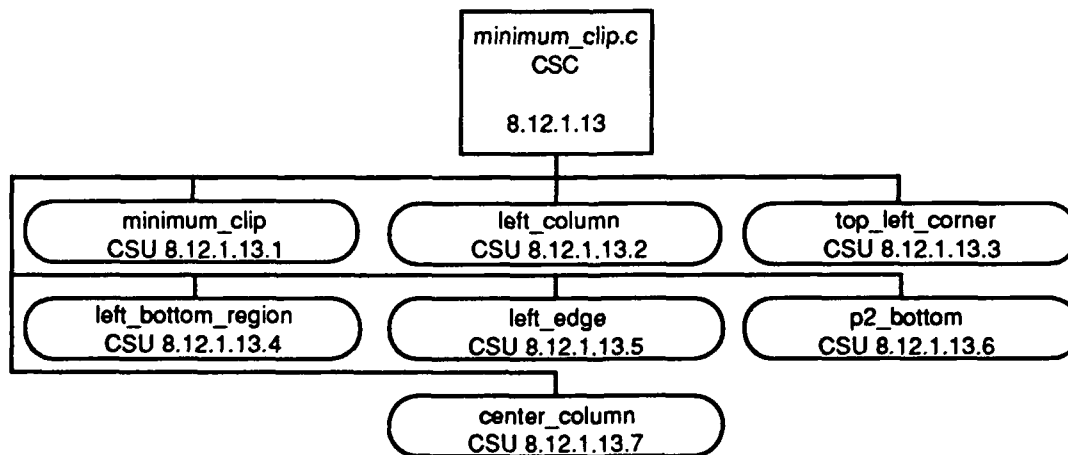
Parameters		
Parameters	Type	Where Typedef Declared
river_seg	pointer to RIVER_SEG	Sec. 2.12.1.18
first_crossing	pointer to WATER_INT	Sec. 2.12.1.18
last_crossing	pointer to WATER_INT	Sec. 2.12.1.18
reversed	pointer to int	Standard
ReturnValues		
Return Value	Type	Meaning
river_points	pointer to LIST	Resulting list of river segment points.
Calls		
Function	Where Described	
push	Sec. 2.12.1.7.3	
make_vector_2d	Sec. 2.12.1.9.1	

**Table 2.12-92: find\_river\_bend\_points CSU [8.12.1.12.10]**

**2.12.1.13 minimum\_clip.c CSC**

/simnet/libsrc/libquad/minimum\_clip.c

This CSC contains the CSUs necessary to determine if a line segment intersects a box. In addition, it contains macros, defined in Appendix A, used by these CSUs.



**Figure 2.12-14: minimum\_clip.c CSC Structure**

**2.12.1.13.1      minimum\_clip CSU**

This CSU determines whether a line segment intersects an area.

Parameters		
Parameters	Type	Where Typedef Declared
x left	INT32	Sec. 2.12.1.18
y top	INT32	Sec. 2.12.1.18
x right	INT32	Sec. 2.12.1.18
y bottom	INT32	Sec. 2.12.1.18
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
display=TRUE	int	Line segment intersects area.
display=FALSE	int	Line segment does not intersect area.
Calls		
Function	Where Described	
left_column	Sec. 2.12.1.13.2	
rotate 180 c	See Appendix A	
center_column	Sec. 2.12.1.13.7	

Table 2.12-93: minimum\_clip CSU [8.12.1.13.1]

**2.12.1.13.2      left\_column CSU**

This CSU determines whether a line segment intersects an area if one point is beyond the left boundary.

Parameters		
Parameters	Type	Where Typedef Declared
x left	INT32	Sec. 2.12.1.18
y top	INT32	Sec. 2.12.1.18
x right	INT32	Sec. 2.12.1.18
y bottom	INT32	Sec. 2.12.1.18
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
Calls		
Function	Where Described	
top left corner	Sec. 2.12.1.13.3	
reflect x axis	See Appendix A	
left edge	Sec. 2.12.1.13.5	

Table 2.12-94: left\_column CSU [8.12.1.13.2]

**2.12.1.13.3 top\_left\_corner CSU**

This CSU determines an intersection if one point is in the top left corner and the other point is not beyond the left boundary.

Parameters		
Parameters	Type	Where Typedef Declared
x left	INT32	Sec. 2.12.1.18
y top	INT32	Sec. 2.12.1.18
x right	INT32	Sec. 2.12.1.18
y bottom	INT32	Sec. 2.12.1.18
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
Calls		
Function	Where Described	
left bottom region	Sec. 2.12.1.13.4	
reflect x minus y	See Appendix A	

Table 2.12-95: top\_left\_corner CSU [8.12.1.13.3]

**2.12.1.13.4 left\_bottom\_region CSU**

This CSU determines an intersection if one point is to the right of the vector from the other point to the top left corner.

Parameters		
Parameters	Type	Where Typedef Declared
x left	INT32	Sec. 2.12.1.18
y top	INT32	Sec. 2.12.1.18
x right	INT32	Sec. 2.12.1.18
y bottom	INT32	Sec. 2.12.1.18
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
rel x2	double	Standard
rel y2	double	Standard
left_product	double	Standard

Table 2.12-96: left\_bottom\_region CSU [8.12.1.13.4]

**2.12.1.13.5 left\_edge CSU**

This CSU determines an intersection if one point is in the left edge region.

Parameters		
Parameters	Type	Where Typedef Declared
x left	INT32	Sec. 2.12.1.18
y top	INT32	Sec. 2.12.1.18
x right	INT32	Sec. 2.12.1.18
y bottom	INT32	Sec. 2.12.1.18
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
Calls		
Function	Where Described	
p2_bottom	Sec. 2.12.1.13.6	
reflect x axis	See Appendix A	

Table 2.12-97: left\_edge CSU [8.12.1.13.5]

**2.12.1.13.6 p2\_bottom CSU**

This CSU determines an intersection if one point is in the left edge region, and the other point is not beyond the left boundary and is beyond the bottom boundary.

Parameters		
Parameters	Type	Where Typedef Declared
x left	INT32	Sec. 2.12.1.18
y top	INT32	Sec. 2.12.1.18
x right	INT32	Sec. 2.12.1.18
y bottom	INT32	Sec. 2.12.1.18
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18

Table 2.12-98: p2\_bottom CSU [8.12.1.13.6]

**2.12.1.13.7 center\_column CSU**

This CSU determines an intersection if one point is between the left and right boundaries.

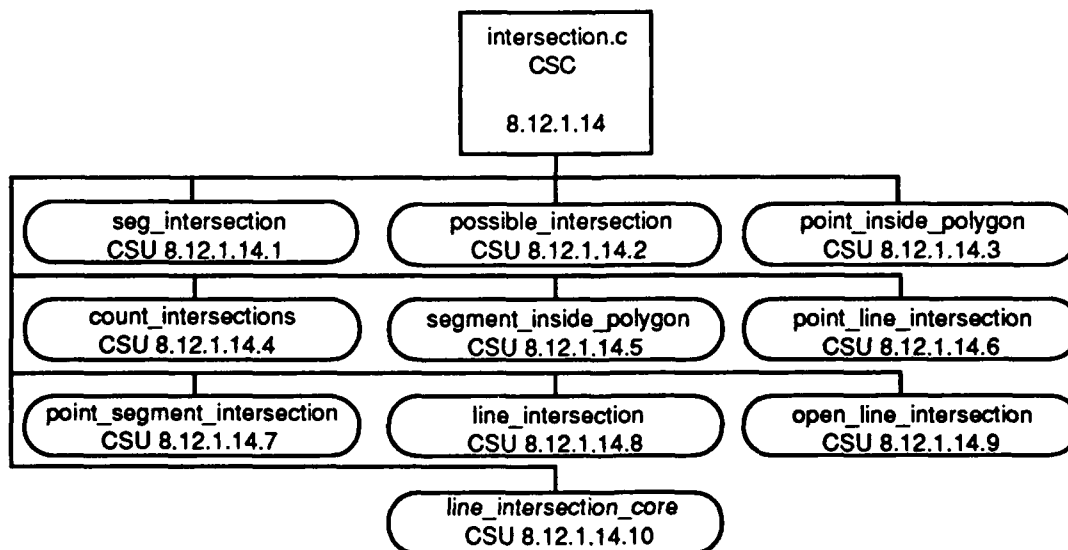
Parameters		
Parameters	Type	Where Typedef Declared
x left	INT32	Sec. 2.12.1.18
y top	INT32	Sec. 2.12.1.18
x right	INT32	Sec. 2.12.1.18
y bottom	INT32	Sec. 2.12.1.18
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
Calls		
Function	Where Described	
rotate 270 c	See Apendix A	
left edge	Sec. 2.12.1.13.5	
rotate 90 c	See Apendix A	

**Table 2.12-99: center\_column CSU [8.12.1.13.7]**

**2.12.1.14 intersection.c CSC**

/simnet/libsrc/libquad/intersection.c

This CSC contains CSUs that deal with intersections.



**Figure 2.12-15: intersection.c CSC Structure**

**2.12.1.14.1      seg\_intersection CSU**

This CSU determines whether a line segment intersects a point list.

Parameters		
Parameters	Type	Where Typedef Declared
points	pointer to INT32	Sec. 2.12.1.18
num_pts	INT16	Sec. 2.12.1.18
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Line intersects point list.
FALSE	int	Line does not intersect point list.
Calls		
Function	Where Described	
line_intersection	Sec. 2.12.1.14.8	

**Table 2.12-100:    seg\_intersection CSU [8.12.1.14.1]**

**2.12.1.14.2      possible\_intersection CSU**

This CSU determines whether a line segment intersects an area.

Parameters		
Parameters	Type	Where Typedef Declared
x_min	INT32	Sec. 2.12.1.18
y_min	INT32	Sec. 2.12.1.18
x_max	INT32	Sec. 2.12.1.18
y_max	INT32	Sec. 2.12.1.18
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
minimum_clip(...)	int	Function call to determine if line intersects the area.
Calls		
Function	Where Described	
minimum_clip	Sec. 2.12.1.13.1	

**Table 2.12-101:    possible\_intersection CSU [8.12.1.14.2]**

**2.12.1.14.3 point\_inside\_polygon CSU**

This CSU determines whether a point is inside a polygon.

Parameters		
Parameters	Type	Where Typedef Declared
points	pointer to INT32	Sec. 2.12.1.18
num_pts	INT16	Sec. 2.12.1.18
x	INT32	Sec. 2.12.1.18
y	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Point is inside polygon.
ODD P(...) = 1	int	Point is inside polygon.
ODD P(...) = 0	int	Point is not inside polygon.
Calls		
Function	Where Described	
count_intersections	Sec. 2.12.1.14.4	
ODD P	See Appendix A	

**Table 2.12-102: point\_inside\_polygon CSU [8.12.1.14.3]**

**2.12.1.14.4 count\_intersections CSU**

This CSU counts the number of times a line segment intersects a point list.

Parameters		
Parameters	Type	Where Typedef Declared
points	pointer to INT32	Sec. 2.12.1.18
num_pts	INT16	Sec. 2.12.1.18
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
-1	int	Line does not intersect point list.
sum	int	Number of times line intersects point list.
Calls		
Function	Where Described	
line intersection	Sec. 2.12.1.14.8	
open line intersection	Sec. 2.12.1.14.9	

**Table 2.12-103: count\_intersections CSU [8.12.1.14.4]**



**2.12.1.14.5 segment\_inside\_polygon CSU**

This CSU determines whether both ends of a line segment are inside a polygon.

Parameters		
Parameters	Type	Where Typedef Declared
points	pointer to INT32	Sec. 2.12.1.18
num_pts	INT16	Sec. 2.12.1.18
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
point_inside_polygon(...) && point_inside_polygon(...) = TRUE	int	Both ends of line are inside polygon.
point_inside_polygon(...) && point_inside_polygon(...) = FALSE	int	Both ends of line are not inside polygon.
Calls		
Function	Where Described	
point_inside_polygon	Sec. 2.12.1.14.3	

**Table 2.12-104: segment\_inside\_polygon CSU [8.12.1.14.5]**

**2.12.1.14.6 point\_line\_intersection CSU**

This CSU calculates the perpendicular intersection of a point with a line segment.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
p1	INT32	Sec. 2.12.1.18
p2	INT32	Sec. 2.12.1.18
ix	pointer to INT32	Sec. 2.12.1.18
iy	pointer to INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
line_intersection_core(...)	int	Intersection point.

Calls	
Function	Where Described
VEC SUB 2D	See Appendix A
vec normalize 2d	Sec. 2.12.1.9.2
vec rotate 2d	Sec. 2.12.1.9.3
VEC ADD 2D	See Appendix A
line_intersection_core	Sec. 2.12.1.14.10

Table 2.12-105: point\_line\_intersection CSU [8.12.1.14.6]

## 2.12.1.14.7 point\_segment\_intersection CSU

This CSU calculates the perpendicular intersection of a point with a point list.

Parameters		
Parameters	Type	Where Typedef Declared
points	pointer to INT32	Sec. 2.12.1.18
num_points	INT32	Sec. 2.12.1.18
p1	INT32	Sec. 2.12.1.18
p2	INT32	Sec. 2.12.1.18
px	pointer to INT32	Sec. 2.12.1.18
py	pointer to INT32	Sec. 2.12.1.18
Calls		
Function	Where Described	
point_line_intersection	Sec. 2.12.1.14.6	
distance	Sec. 2.12.1.11.1	

Table 2.12-106: point\_segment\_intersection CSU [8.12.1.14.7]

## 2.12.1.14.8 line\_intersection CSU

This CSU calculates the intersection point of two line segments.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
x3	INT32	Sec. 2.12.1.18
y3	INT32	Sec. 2.12.1.18
x4	INT32	Sec. 2.12.1.18
y4	INT32	Sec. 2.12.1.18
ix	pointer to INT32	Sec. 2.12.1.18
iy	pointer to INT32	Sec. 2.12.1.18

ReturnValues		
Return Value	Type	Meaning
TRUE	int	Lines intersect.
FALSE	int	Lines do not intersect.
Calls		
Function	Where Described	
line_intersection_core	Sec. 2.12.1.14.10	

Table 2.12-107: line\_intersection CSU [8.12.1.14.8]

## 2.12.1.14.9 open\_line\_intersection CSU

This CSU calculates the intersection point of two line segments, but does not consider intersections at the end points of either segment as valid.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
x3	INT32	Sec. 2.12.1.18
y3	INT32	Sec. 2.12.1.18
x4	INT32	Sec. 2.12.1.18
y4	INT32	Sec. 2.12.1.18
ix	pointer to INT32	Sec. 2.12.1.18
iy	pointer to INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Lines intersect.
FALSE	int	Lines do not intersect.
Calls		
Function	Where Described	
line_intersection_core	Sec. 2.12.1.14.10	

Table 2.12-108: open\_line\_intersection CSU [8.12.1.14.9]

**2.12.1.14.10 line\_intersection\_core CSU**

This CSU calculates the location of the intersection point of two line segments.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
x3	INT32	Sec. 2.12.1.18
y3	INT32	Sec. 2.12.1.18
x4	INT32	Sec. 2.12.1.18
y4	INT32	Sec. 2.12.1.18
ix	pointer to INT32	Sec. 2.12.1.18
iy	pointer to INT32	Sec. 2.12.1.18

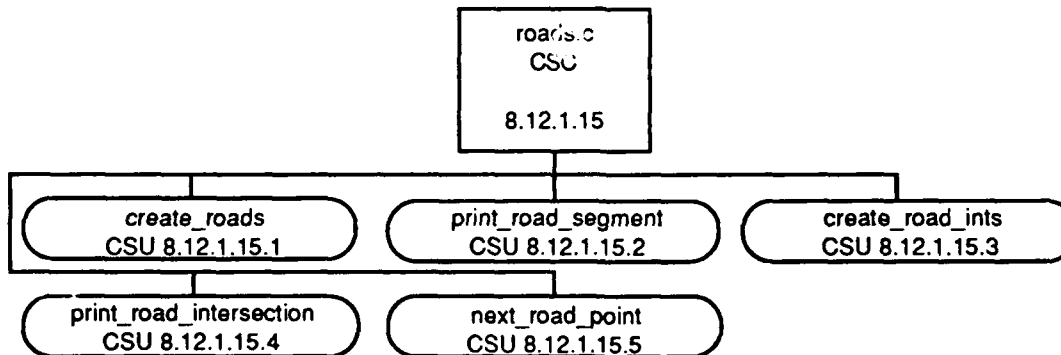
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Lines intersect.
FALSE	int	Lines do not intersect.

**Table 2.12-109: line\_intersection\_core CSU [8.12.1.14.10]**

**2.12.1.15 roads.c CSC**

/simnet/libsrc/libquad/roads.c

This CSC contains CSUs that deal with roads.



**Figure 2.12-16: roads.c CSC Structure**

**2.12.1.15.1 create\_roads CSU**

This CSU reads road segment structures.

Parameters		
Parameters	Type	Where Typedef Declared
directory	pointer to char	Standard
Errors		
Error Name	Reason for Error	
File Error : ... : Open to read	Unable to open file.	
Error: Can't allocate ... road segments	Unable to allocate memory for road segments.	
Error: Can't allocate ... points	Unable to allocate memory for road points.	
Error: Reading road point list	The correct number of road points was not read.	
Calls		
Function	Where Described	
heap allocate	Sec. 2.14.2.1.1	
allocate points	Sec. 2.12.1.1.5	
print road segment	Sec. 2.12.1.15.2	

Table 2.12-110: create\_roads CSU [8.12.1.15.1]

**2.12.1.15.2 print\_road\_segment CSU**

This CSU displays road segments.

Parameters		
Parameters	Type	Where Typedef Declared
segment_index	int	Standard

Table 2.12-111: print\_road\_segment CSU [8.12.1.15.2]

**2.12.1.15.3 create\_road\_ints CSU**

This CSU reads road intersection structures.

Parameters		
Parameters	Type	Where Typedef Declared
directory	pointer to char	Standard
Errors		
Error Name	Reason for Error	
File Error : ... : Open to read	Unable to open file.	
Error: Can't allocate ... road intersections	Unable to allocate memory for road intersections.	
Error: Can't allocate ... pairs	Unable to allocate memory for number pairs.	
Error: Reading road intersection pair list	The correct number of road intersection pairs was not read.	

Calls	
Function	Where Described
heap_allocate	Sec. 2.14.2.1.1
print_road_intersection	Sec. 2.12.1.15.4

Table 2.12-112: create\_road\_ints CSU [8.12.1.15.3]

## 2.12.1.15.4 print\_road\_intersection CSU

This CSU displays road intersections.

Parameters		
Parameters	Type	Where Typedef Declared
int_index	int	Standard

Table 2.12-113: print\_road\_intersection CSU [8.12.1.15.4]

## 2.12.1.15.5 next\_road\_point CSU

This CSU contains two constant definitions.

Constant	Value
LEEWAY	10
MIN_ANGLE /* 15 degrees */	0.25

Table 2.12-114: next\_road\_point Constant Definitions

This CSU calculates the next road point given a point on a road and a direction vector.

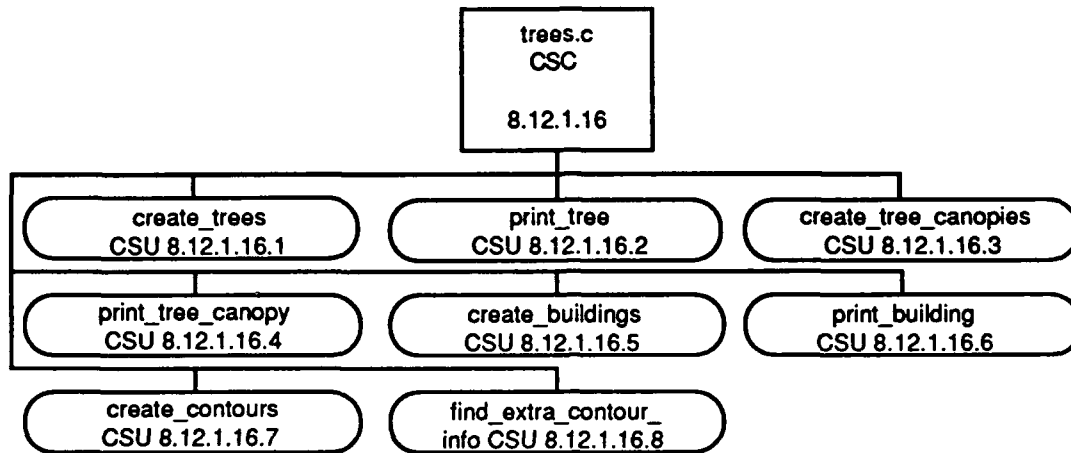
Parameters		
Parameters	Type	Where Typedef Declared
x	INT32	Sec. 2.12.1.18
y	INT32	Sec. 2.12.1.18
vector	pointer to VECTOR_2D	Sec. 2.12.1.18
first_id	int	Standard
ReturnValues		
Return Value	Type	Meaning
NULL_PTR	pointer to ROAD_INFO	No features found.
&real_road_ret	pointer to ROAD_INFO	Next road point.
Calls		
Function	Where Described	
find_a_quad	Sec. 2.12.1.5.1	
VEC_SUB_2D	See Appendix A	
interior_angle_between_vectors	Sec. 2.14.3.5.8	

Table 2.12-115: next\_road\_point CSU [8.12.1.15.5]

**2.12.1.16 trees.c CSC**

/simnet/libsrc/libquad/trees.c

This CSC contains CSUs dealing with trees, canopies, and buildings.

**Figure 2.12-17: trees.c CSC Structure****2.12.1.16.1 create\_trees CSU**

This CSU reads tree structures.

Parameters		
Parameter	Type	Where Typedef Declared
directory	pointer to char	Standard
Errors		
Error Name	Reason for Error	
File Error : ... : Open to read	Unable to open file.	
Error: Can't allocate ... trees	Unable to allocate memory for trees.	
Error: Can't allocate ... points	Unable to allocate memory for tree points.	
Error: Reading tree point list	The correct number of tree points was not read.	
Calls		
Function	Where Described	
heap allocate	Sec. 2.14.2.1.1	
allocate points	Sec. 2.12.1.1.5	
print tree	Sec. 2.12.1.16.2	

**Table 2.12-116: create\_trees CSU [8.12.1.16.1]**

**2.12.1.16.2      print\_tree CSU**

This CSU displays trees.

Parameters		
Parameters	Type	Where Typedef Declared
index	int	Standard

**Table 2.12-117:    print\_tree CSU [8.12.1.16.2]**

**2.12.1.16.3      create\_tree\_canopies CSU**

This CSU reads tree canopy structures.

Parameters		
Parameter	Type	Where Typedef Declared
directory	pointer to char	Standard
Errors		
Error Name	Reason for Error	
File Error : ... : Open to read	Unable to open file.	
Error: Can't allocate ... tree canopies	Unable to allocate memory for tree canopies.	
Error: Can't allocate ... points	Unable to allocate memory for tree canopy points.	
Error: Reading tree canopy point list	The correct number of tree canopy points was not read.	
Calls		
Function	Where Described	
heap allocate	Sec. 2.14.2.1.1	
print tree canopy	Sec. 2.12.1.16.4	

**Table 2.12-118:    create\_tree\_canopies CSU [8.12.1.16.3]**

**2.12.1.16.4      print\_tree\_canopy CSU**

This CSU displays tree canopies.

Parameters		
Parameters	Type	Where Typedef Declared
canopy_index	int	Standard

**Table 2.12-119:    print\_tree\_canopy CSU [8.12.1.16.4]**



**2.12.1.16.5 create\_buildings CSU**

This CSU reads building structures.

Parameters		
Parameter	Type	Where Typedef Declared
directory	pointer to char	Standard
Errors		
Error Name	Reason for Error	
File Error : ... : Open to read	Unable to open file.	
Error: Can't allocate ... buildings	Unable to allocate memory for buildings.	
Error: Can't allocate ... points	Unable to allocate memory for building points.	
Error: Reading building point list	The correct number of building points was not read	
Calls		
Function	Where Described	
heap allocate	Sec. 2.14.2.1.1	
allocate points	Sec. 2.12.1.1.5	
print building	Sec. 2.12.1.16.6	

**Table 2.12-120: create\_buildings CSU [8.12.1.16.5]**

**2.12.1.16.6 print\_building CSU**

This CSU displays buildings.

Parameters		
Parameters	Type	Where Typedef Declared
index	int	Standard

**Table 2.12-121: print\_building CSU [8.12.1.16.6]**

**2.12.1.16.7 create\_contours CSU**

This CSU reads contour line structures.

Parameters		
Parameter	Type	Where Typedef Declared
directory	pointer to char	Standard
Errors		
Error Name	Reason for Error	
File Error : ... : Open to read	Unable to open file.	
Error: Can't allocate ... contours	Unable to allocate memory for contours.	
Error: Can't allocate ... points	Unable to allocate memory for contour points.	
Error: Reading contour point list	The correct number of contour points was not read.	

Calls	
Function	Where Described
heap allocate	Sec. 2.14.2.1.1
allocate points	Sec. 2.12.1.1.5
find extra contour info	Sec. 2.12.1.16.8
print tree canopy	Sec. 2.12.1.16.4

Table 2.12-122: create\_contours CSU [8.12.1.16.7]

## 2.12.1.16.8 find\_extra\_contour\_info CSU

This CSU calculates the boundary box around a contour line.

Parameters		
Parameters	Type	Where Typedef Declared
contour	pointer to CANOPY	Sec. 2.12.1.18

Table 2.12-123: find\_extra\_contour\_info CSU [8.12.1.16.8]

## 2.12.1.17 building\_check.c CSC

/simnet/libsrc/libquad/building\_check.c

This CSC checks the relationships between building locations and view.

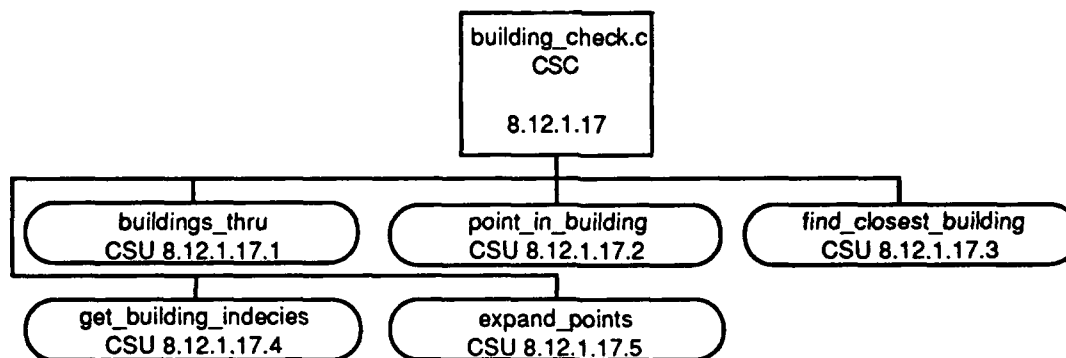


Figure 2.12-18: building\_check.c CSC Structure

**2.12.1.17.1 buildings\_thru CSU**

This CSU determines whether a line segment intersects a building structure.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
offset	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
NULL_PTR	pointer to BOUNDING BOX	No intersection.
bbox	pointer to BOUNDING BOX	Intersected building.
Calls		
Function	Where Described	
get_building indecies	Sec. 2.12.1.17.4	
minimum clip	Sec. 2.12.1.13.1	
push	Sec. 2.12.1.7.3	
free list	Sec. 2.12.1.7.4	
find closest building	Sec. 2.12.1.17.3	

**Table 2.12-124: buildings\_thru CSU [8.12.1.17.1]**

**2.12.1.17.2 point\_in\_building CSU**

This CSU determines whether a point is within a building structure.

Parameters		
Parameters	Type	Where Typedef Declared
x	INT32	Sec. 2.12.1.18
y	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Point is in building.
FALSE	int	Point is not in building.
Calls		
Function	Where Described	
get_building indecies	Sec. 2.12.1.17.4	
minimum clip	Sec. 2.12.1.13.1	
free_list	Sec. 2.12.1.7.4	

**Table 2.12-125: point\_in\_building CSU [8.12.1.17.2]**

**2.12.1.17.3 find\_closest\_building CSU**

This CSU finds the closest building to a point.

Parameters		
Parameters	Type	Where Typedef Declared
x	INT32	Sec. 2.12.1.18
y	INT32	Sec. 2.12.1.18
building_list	pointer to LIST	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
NULL_PTR	pointer to BUILDING	No buildings in list.
building_list->car	pointer to BUILDING	Only one building in list.
building1	pointer to BUILDING	Closest building found.
Calls		
Function	Where Described	
distance	Sec. 2.12.1.11.1	

**Table 2.12-126: find\_closest\_building CSU [8.12.1.17.3]**

**2.12.1.17.4 get\_building\_indecies CSU**

This CSU returns all of the building indices within an area.

Parameters		
Parameters	Type	Where Typedef Declared
x1	INT32	Sec. 2.12.1.18
y1	INT32	Sec. 2.12.1.18
x2	INT32	Sec. 2.12.1.18
y2	INT32	Sec. 2.12.1.18
ReturnValues		
Return Value	Type	Meaning
building_index_list	pointer to LIST	List of building indices.
Calls		
Function	Where Described	
get_quad_nodes	Sec. 2.12.1.5.2	
MIN	See Appendix A	
MAX	See Appendix A	
push	Sec. 2.12.1.7.3	
free_list	Sec. 2.12.1.7.4	
remove_duplicates	Sec. 2.12.1.7.5	

**Table 2.12-127: get\_building\_indecies CSU [8.12.1.17.4]**

**2.12.1.17.5      expand\_points CSU**

This CSU expands the size of a building by the value of *offset*.

Parameters		
Parameters	Type	Where Typedef Declared
points	pointer to INT32	Sec. 2.12.1.18
mid_x	double	Standard
mid_y	double	Standard
offset	double	Standard
ReturnValues		
Return Value	Type	Meaning
new_points	pointer to INT32	Expanded building.
Calls		
Function	Where Described	
VEC SUB 2D	See Appendix A	
vec normalize 2d	Sec. 2.12.1.9.2	
VEC SCALE 2D	See Appendix A	
VEC ADD 2D	See Appendix A	
heap_allocate	Sec. 2.14.2.1.1	

**Table 2.12-128:    expand\_points CSU [8.12.1.17.5]**

**2.12.1.18 libquad.h CSU**

/simnet/libsrc/libquad/libquad.h

This header CSC contains defines and structures relative to this library. The constant defines are in the next table.

Constant	Value
POINTS IN TDB	1000000
HALF PI	1.5707963267948966
MAX DISTANCE	100000
NULL PTR	0
NULL VAL	-1
BRIDGE CROSSING	0
INTERSECTION CROSSING	1
FORDABLE CROSSING	2
RIVER TYPE	0
LAKE TYPE	1
FORDABLE TYPE	2
CROSS COUNTRY POINT	0
BRIDGE POINT	1
CLOCKWISE	0
ANTICLOCKWISE	1
FROM GOAL	0
TO GOAL	1
START	0
END	1
AS IS	0
ROTATED	1

**Table 2.12-129: libquad.h Constant Definitions**

Macros are expanded in Appendix A. The following three typedefs deal with integer sizes.

Data Type	Assigned Type
long	INT32
short	INT16
char	INT8

**Table 2.12-130: libquad.h Integer Type Definitions**

The typedef structs are in the following tables.

The following typedef struct is tagged list.

Item	Type	Where Type Defined
car	int	Standard
cdr	pointer to struct list	This typedef struct

**Table 2.12-131: LIST Structure Definition**

Following the LIST typedef struct are the external declares LIST \*intersections\_searched and LIST \*quad\_index\_list.

The quadtree typedef structure below is tagged quadtree.

Item	Type	Where Type Defined
size	INT32	This file
resolution	INT32	This file
x	INT32	This file
y	INT32	This file
num_modes	int	Standard
name	pointer to char	Standard
version	int	Standard
max x	INT32	This file
max y	INT32	This file

**Table 2.12-132: QUADTREE Structure Definition**

Following the QUADTREE typedef struct is the declare, QUADTREE quadtree.

The quadtree nodes structure is tagged quadnode.

Item	Type	Where Type Defined
feature_index	int	Standard
child_index	int	Standard

**Table 2.12-133: QUAD\_NODE Structure Definition**

Following the QUAD\_NODE typedef struct is the declare, QUAD\_NODE \*quad\_nodes.

The features structure is tagged features.

Item	Type	Where Type Defined
water_indecies	pointer to int	Standard
water_int_indecies	pointer to int	Standard
road_indecies	pointer to int	Standard
road_int_indecies	pointer to int	Standard
bridge_indecies	pointer to int	Standard
lake_indecies	pointer to int	Standard
canopy_indecies	pointer to int	Standard
tree_indecies	pointer to int	Standard
building_indecies	pointer to int	Standard
contour_indecies	pointer to int	Standard

**Table 2.12-134: QUAD\_FEATURES Structure Definition**

Following the QUAD\_FEATURES typedef struct is the declare, QUAD\_FEATURES \*features\_array.

The river segments structure is tagged river\_segment.

Item	Type	Where Type Defined
num_pts	INT16	This file
points	pointer to INT32	This file
width	INT16	This file
distance	INT16	This file
int1	INT16	This file
int2	INT16	This file
x_min	INT32	This file
y_min	INT32	This file
x_max	INT32	This file
y_max	INT32	This file
fordable	INT8	This file

**Table 2.12-135: RIVER\_SEG Structure Definition**

The river segments structure is tagged river\_segments.

Item	Type	Where Type Defined
num_segs	INT32	This file
segments	pointer to RIVER_SEG	The previous typedef struct

**Table 2.12-136: RIVER\_SEGS Structure Definition**

Following the RIVER\_SEGS typedef struct is the declare, RIVER\_SEGS river.

The river intersection structure is tagged river\_int.

Item	Type	Where Type Defined
num_pairs	INT16	This file
pairs	pointer to INT16	This file
x	INT32	This file
y	INT32	This file
bridge	INT16	This file

**Table 2.12-137: RIVER\_INT Structure Definition**

The river intersections structure is tagged river\_ints\_struct.

Item	Type	Where Type Defined
num_ints	INT32	This file
ints	pointer to RIVER_INT	The previous typedef struct

**Table 2.12-138: RIVER\_INTS Structure Definition**

Following the RIVER\_INTS typedef struct is the declare, RIVER\_INTS river\_ints.



The road segment structure is tagged road\_segment.

Item	Type	Where Type Defined
num_pts	INT16	This file
points	pointer to INT32	This file
width	INT16	This file
distance	INT16	This file
int1	INT16	This file
int2	INT16	This file
x_min	INT32	This file
y_min	INT32	This file
x_max	INT32	This file
y_max	INT32	This file
bridge	INT8	This file

**Table 2.12-139: ROAD\_SEG Structure Definition**

The road segments structure is tagged road\_segments.

Item	Type	Where Type Defined
num_segs	INT32	This file
segments	pointer to ROAD_SEG	The previous typedef struct

**Table 2.12-140: ROAD\_SEGS Structure Definition**

Following the ROAD\_SEGS typedef struct is the declare, ROAD\_SEGS roads.

The road intersection structure is tagged road\_int.

Item	Type	Where Type Defined
num_pairs	INT16	This file
pairs	pointer to INT16	This file
x	INT32	This file
y	INT32	This file
bridge	INT16	This file

**Table 2.12-141: ROAD\_INT Structure Definition**

The road intersections structure is tagged road\_ints\_struct.

Item	Type	Where Type Defined
num_ints	INT32	This file
ints	pointer to ROAD_INT	The previous typedef struct

**Table 2.12-142: ROAD\_INTS Structure Definition**

Following the ROAD\_INTS typedef struct is the declare, ROAD\_INTS road\_ints.

The bridge structure is tagged bridge\_struct.

Item	Type	Where Type Defined
num_pts	INT16	This file
points	pointer to INT16	This file
x	INT32	This file
y	INT32	This file
width	INT16	This file

**Table 2.12-143: BRIDGE Structure Definition**

The bridges structure is tagged bridges\_struct.

Item	Type	Where Type Defined
num_bridges	INT32	This file
bridge_ptr	pointer to BRIDGE	The previous typedef struct

**Table 2.12-144: BRIDGES Structure Definition**

Following the BRIDGES typedef struct is the declare, BRIDGES bridges.

The lake structure is tagged lake\_struct.

Item	Type	Where Type Defined
num_pts	INT16	This file
points	pointer to INT32	This file
x_min	INT32	This file
y_min	INT32	This file
x_max	INT32	This file
y_max	INT32	This file

**Table 2.12-145: LAKE Structure Definition**

The lakes structure is tagged lakes\_struct.

Item	Type	Where Type Defined
num_lakes	INT32	This file
lake_ptr	pointer to LAKE	The previous typedef struct

**Table 2.12-146: LAKES Structure Definition**

Following the LAKES typedef struct is the declare, LAKES lakes.

The tree canopy structure is tagged canopy\_struct.

Item	Type	Where Type Defined
num_pts	INT16	This file
points	pointer to INT32	This file
x_min	INT32	This file
y_min	INT32	This file
x_max	INT32	This file
y_max	INT32	This file
height	INT16	This file

**Table 2.12-147: CANOPY Structure Definition**

The tree canopies structure is tagged canopies\_struct.

Item	Type	Where Type Defined
num_canopies	INT32	This file
canopy_ptr	pointer to CANOPY	The previous typedef struct

**Table 2.12-148: CANOPIES Structure Definition**

Following the CANOPIES typedef struct is the declare, CANOPIES canopies.

The tree and treeline structure is tagged tree\_struct.

Item	Type	Where Type Defined
num_pts	INT16	This file
points	pointer to INT32	This file
height	INT16	This file

**Table 2.12-149: TREE Structure Definition**

The trees and treeline structure is tagged trees\_struct.

Item	Type	Where Type Defined
num_trees	INT32	This file
tree_ptr	pointer to TREE	The previous typedef struct

**Table 2.12-150: TREES Structure Definition**

Following the TREES typedef struct is the declare, TREES trees.

The building structure is tagged building\_struct.

Item	Type	Where Type Defined
num_pts	INT16	This file
points	pointer to INT32	This file
x_min	INT32	This file
y_min	INT32	This file
x_max	INT32	This file
y_max	INT32	This file
height	INT16	This file

**Table 2.12-151: BUILDING Structure Definition**

The buildings structure is tagged buildings\_struct.

Item	Type	Where Type Defined
num_buildings	INT32	This file
building_ptr	pointer to BUILDING	The previous typedef struct

**Table 2.12-152: BUILDINGS Structure Definition**

Following the BUILDINGS typedef struct is the declare, BUILDINGS buildings.

The following typedef struct is tagged crossing.

Item	Type	Where Type Defined
type	int	Standard
segment_list	pointer to LIST	This file
union{		
bridge	pointer to BRIDGE	This file
intersection	pointer to RIVER_INT	This file
segment	pointer to RIVER_SEG	This file
} crossing		

**Table 2.12-153: RIVER\_CROSSING Structure Definition**

The following typedef struct is tagged vector.

Item	Type	Where Type Defined
x	double	Standard
y	double	Standard

**Table 2.12-154: VECTOR\_2D Structure Definition**

The following typedef struct is tagged water\_int.

Item	Type	Where Type Defined
type	int	Standard
index	int	Standard
intersection	pointer to VECTOR 2D	The previous typedef struct
seg_point_1	pointer to VECTOR 2D	The previous typedef struct
seg_point_2	pointer to VECTOR 2D	The previous typedef struct

**Table 2.12-155: WATER\_INT Structure Definition**

The following typedef struct is tagged route\_pt.

Item	Type	Where Type Defined
x	INT32	This file
y	INT32	This file
type	int	Standard

**Table 2.12-156: ROUTE\_PT Structure Definition**

The following typedef struct is tagged bounding\_box.

Item	Type	Where Type Defined
x_min	INT32	This file
y_min	INT32	This file
x_max	INT32	This file
y_max	INT32	This file

**Table 2.12-157: BOUNDING\_BOX Structure Definition**

The following typedef struct is tagged road\_info.

Item	Type	Where Type Defined
index	int	Standard
x	INT32	This file
y	INT32	This file
bridge	INT8	This file

**Table 2.12-158: ROAD\_INFO Structure Definition**

## 2.13 GLOBAL CSC

The Global CSC defines the global variables, constants, macros, and CSUs which are used throughout the SAF Simhost CSCI.

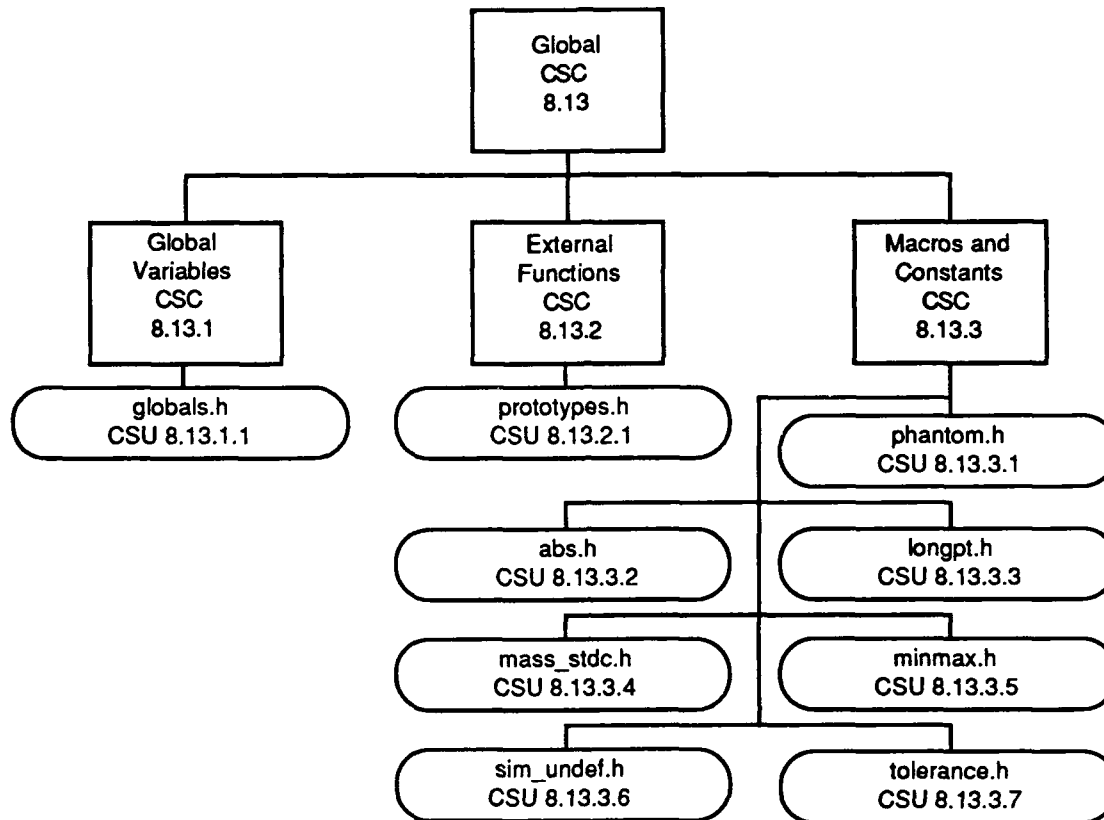


Figure 2.13-1: Global CSC Structure

### 2.13.1 Global Variables CSC

The Global Variables CSC [8.13.1] contains one file, `globals.h`.

#### 2.13.1.1 `globals.h` CSU

`/simnet/src/host/globals.h`

This file contains the external declarations for the globally accessed variables of the phantom. State variables and variables which hold the tables of information loaded in from the .lisp files are declared.

### 2.13.2 External Functions CSC

The External Functions CSC [8.13.2] contains one file, `prototype.h`

**2.13.2.1 prototypes.h CSU**

/simnet/src/host/prototypes.h

This file contains external declarations for a number of functions which are used in the phantom.

**2.13.3 Macros and Constants CSC**

The Macros and Constants CSC [8.13.3] contains much of the globally used macros and constants in eight header files.

**2.13.3.1 phantom.h CSU**

/simnet/src/host/phantom.h

This CSU acts as a central repository for all of the include files which will be needed during compilation. All of the .c files need only to include this file, and all of the phantom .h's and library and standard includes will be used. The file also contains macro definitions for speed conversions and vehicle status queries, which are shown in Appendix A, and constants contained in the following table.

Constant	Value
MAX_VEH	2048
SOIL_NA	0 /* Unknown type of soil */
SOIL_ROAD	1 /* Asphalt or other hard surface */
SOIL_RC1250	2 /* Packed soil */
SOIL_RC1050	3 /* Sandy soil */
SOIL_WATER	5 /* River that is passable */
SOIL_MUCK	4 /* River that is impassable */
MAX_VIEWS	3
SMALL_VELOCITY_SQUARED	25
TERRAIN_GRID_SIZE	100
GRAVITY	9.8
COMPOSITE_MONITOR_TIME	120000
MAX_VISION_RANGE	3500.0 /* meters (same as sims) */
ADA_MAX_VISION_RANGE	7000.0
SECONDS2GALLONS	0.0125 /* Fuel consumption constant */
MAX_TDB_EXTENSION	5000.0
VEHICLE_STATUS_IMMOBILE	0x01 /* Vehicle status bits */
VEHICLE_STATUS_CANTFIRE	0x02
VEHICLE_STATUS_DESTROYED	0x03
VEHICLE_STATUS_OUTOFGAS	0x08
VEHICLE_STATUS_OUT_FAMMO	0x10
VEHICLE_STATUS_STUCK	0x80
VEHICLE_STATUS_CANTMOVE	0x8D /* immobile   destroyed   outofgas   stuck */
HULL_STATE_NORMAL	0 /* Ground vehicle states */
HULL_STATE_TRASHING	1
HULL_STATE_TRASHED	2

**Table 2.13-1: phantom.h Constant Definitions**

**2.13.3.2 abs.h CSU**

/simnet/include/saf/src/abs.h

This CSU contains the macro definition for abs(x) which is described in Appendix A.

**2.13.3.3 longpt.h CSU**

/simnet/include/saf/src/longpt.h

This CSU defines types used for describing points (LongPt) and rectangles (LongRect) with sufficient precision to locate to within a meter in a few hundred kilometers.

Item	Type	Where Type Defined
x, y	long	Standard

Table 2.13-2: LongPt Structure

Item	Type	Where Type Defined
bottom, left, top, right	long	Standard

Table 2.13-3: LongRect Structure

**2.13.3.4 mass\_std.h CSU**

/simnet/include/saf/src/mass\_std.h

This CSU contains the definitions for the basic data types caused by differences in C compilers.

Storage Allocated	Masscomp C Language	Independent Data Type
16 bit signed integer	short	INT_2
32 bit signed integer	int	INT_4
8 bit unsigned integer	unsigned char	BYTE
8 bit unsigned integer	unsigned char	BOOLEAN
16 bit unsigned integer	unsigned short	HWORD
32 bit unsigned integer	unsigned int	WORD
real	float	REAL_4
real	double	REAL_8
8 bit char	char	*STRING

Table 2.13-4: Data type definitions in mass\_std.h



**2.13.3.5 minmax.h CSU**

/simnet/include/saf/src/minmax.h

This CSU contains the macro definitions min(a, b) and max(a, b) which are described in Appendix A.

**2.13.3.6 sim\_undef.h CSU**

/simnet/include/saf/src/sim\_undef.h

This CSU undefines min, max, and eq. The first two are defined in minmax.h (Sec. 2.13.3.5) and eq is contained in tolerance.h (Sec. 2.13.3.7).

**2.13.3.7 tolerance.h CSU**

/simnet/include/saf/src/tolerance.h

This CSU contains a selection of constants, listed below, used as tolerance and threshold levels.

Constant	Value
E_PICO	1.0E-12
E_NANO	1.0E-09
E_MICRO	1.0E-06
E_MILLI	1.0E-03
E_CENTI	1.0E-02
E_DECI	1.0E-01
E_HALF	5.0E-01
E_NINE_TENTHS	9.0E-01
E_ONE	1.0
E_DECA	1.0E01
E_HECTO	1.0E02
E_KILO	1.0E03
E_MEGA	1.0E06
E_GIGA	1.0E09

**Table 2.13-5: tolerance.h Constants**

The tolerance.h CSU also contains two macro definitions eq(x, y, e) and step(x, z, e) which are described in Appendix A.

## 2.14 UTILITIES CSC

This CSC contains CSUs which are used by the remainder of the simhost code. This includes mathematical functions, memory allocation and deallocation utilities.

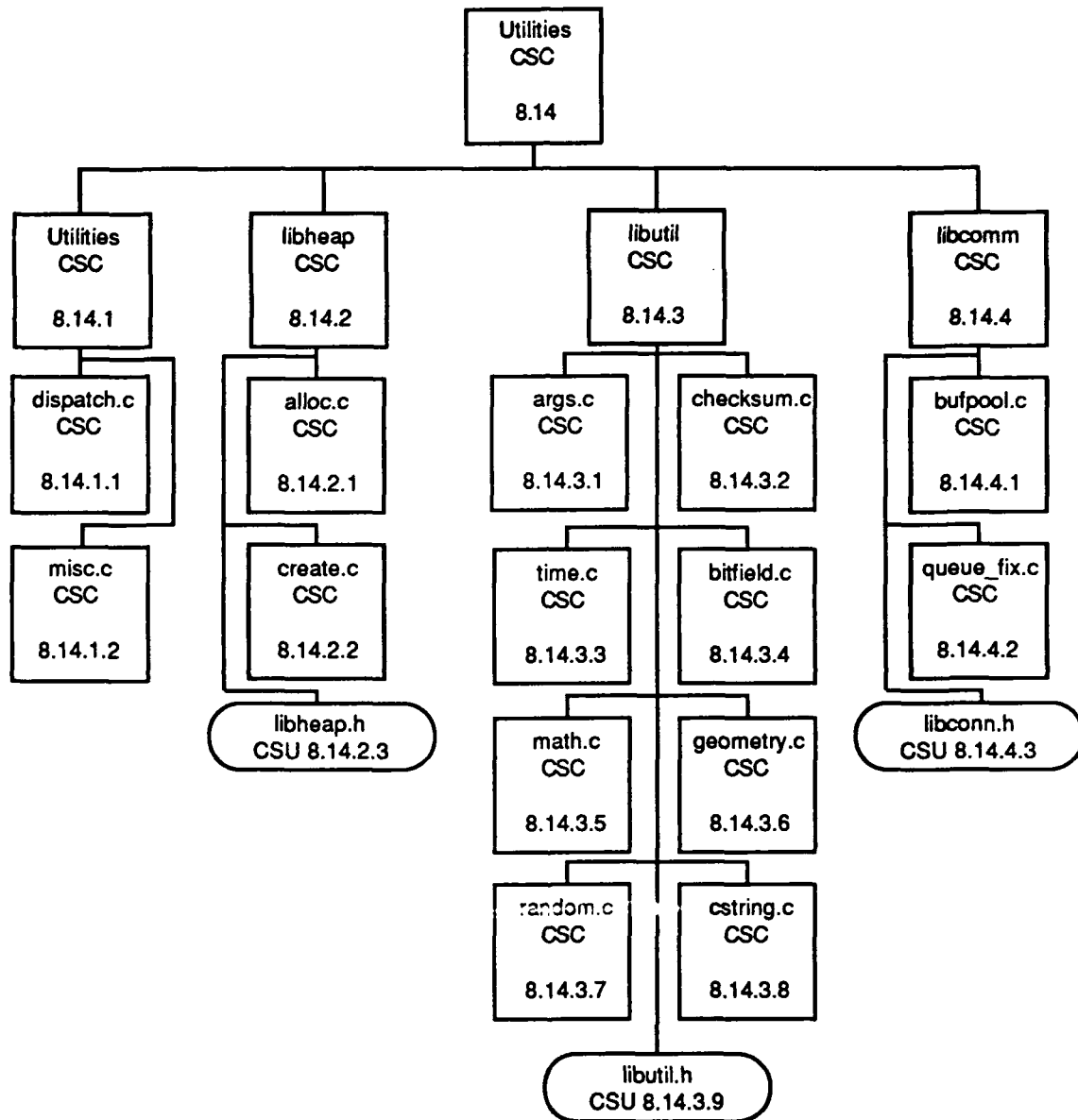


Figure 2.14-1: Utilities CSC Structure

### 2.14.1 Utilities CSC

The Utilities CSC [8.14.1] consists of two files dispatch.c [8.14.1.1], and misc.c [8.14.1.2], .

### 2.14.1.1 dispatch.c CSC

/simnet/src/host/dispatch.c

This CSC contains various CSUs dealing with SAF objects.

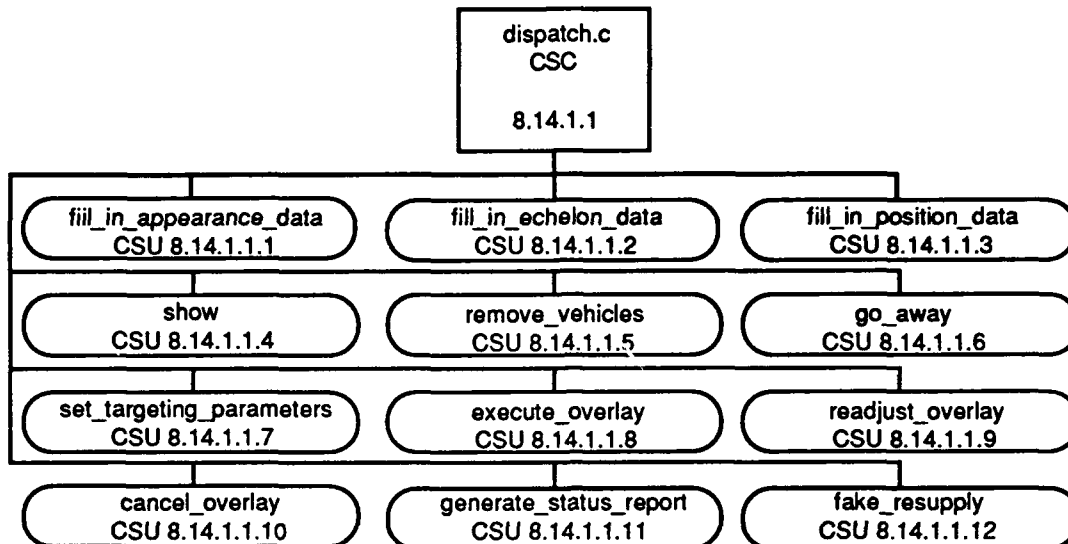


Figure 2.14-2: dispatch.c CSC Structure

#### 2.14.1.1.1 fill\_in\_appearance\_data CSU

This CSU fills in a SAF object's appearance data based on SAF type.

Parameters		
Parameters	Type	Where Typedef Declared
*safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
*desc_ptr	pointer to VEHICLE_APPEARANCE_DESCRIPTOR	Sec. 2.4.1.1
Errors		
Error Name	Reason for Error	
ERROR_OUT	No fill in appearance data function for SAF type	
Calls		
Function	Where Described	
remote_fill_in_appearance_data	Sec. 2.7.1.6	
saf_vehicle_fill_in_appearance_data	Sec. 2.6.1.1.13	
composite_fill_in_appearance_data	Sec. 2.8.1.3.14	
ERROR_OUT	Sec. 2.5.2.2	

Table 2.14-1: fill\_in\_appearance\_data CSU [8.14.1.1.1]

**2.14.1.1.2 fill\_in\_echelon\_data CSU**

This CSU fills in a SAF object's echelon data based on SAF type.

Parameters		
Parameters	Type	Where Typedef Declared
*safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
*desc_ptr	pointer to VEHICLE_ECHELON_ DESCRIPTOR	Sec. 2.4.1.1
Errors		
Error Name	Reason for Error	
ERROR_OUT	No fill in echelon data function for SAF type	
Calls		
Function	Where Described	
remote_fill_in_echelon_data	Sec. 2.7	
saf_vehicle_fill_in_echelon_data	Sec. 2.6.1.1.14	
composite_fill_in_echelon_data	Sec. 2.8.1.3.12	
ERROR_OUT	Sec. 2.5.2.2	

**Table 2.14-2: fill\_in\_echelon\_data CSU [8.14.1.1.2]**

**2.14.1.1.3 fill\_in\_position\_data CSU**

This CSU fills in a SAF object's position data based on SAF type.

Parameters		
Parameters	Type	Where Typedef Declared
*safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
*desc_ptr	pointer to VEHICLE_POSITION_ DESCRIPTOR	Sec. 2.4.1.1
Errors		
Error Name	Reason for Error	
ERROR_OUT	No fill in position data function for SAF type	
Calls		
Function	Where Described	
remote_fill_in_position_data	Sec. 2.7.1.8	
saf_vehicle_fill_in_position_data	Sec. 2.6.1.1.15	
composite_fill_in_position_data	Sec. 2.8.1.3.13	
ERROR_OUT	Sec. 2.5.2.2	

**Table 2.14-3: fill\_in\_position\_data CSU [8.14.1.1.3]**

**2.14.1.1.4 show CSU**

This CSU prints information about a SAF object based on SAF type.

Parameters		
Parameters	Type	Where Typedef Declared
*safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
flags	int	Standard
Errors		
Error Name	Reason for Error	
ERROR_OUT	No show function for SAF type	
Calls		
Function	Where Described	
remote_show	Sec. 2.7.1.4	
saf_vehicle_show	Sec. 2.6.1.1.11	
composite_show	Sec. 2.8.1.3.3	
ERROR_OUT	Sec. 2.5.2.2	

Table 2.14-4: show CSU [8.14.1.1.4]

**2.14.1.1.5 remove\_vehicles CSU**

This CSU removes a SAF object based on SAF type.

Parameters		
Parameters	Type	Where Typedef Declared
*safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
num	int	Standard
v_list[]	unsigned int	Standard
Calls		
Function	Where Described	
saf_vehicle_remove_vehicles	Sec. 2.6.1.1.35	
composite_remove_vehicles	Sec. 2.8.1.3.34	

Table 2.14-5: remove\_vehicles CSU [8.14.1.1.5]

**2.14.1.1.6 go\_away CSU**

This CSU causes a SAF object to go away based on SAF type.

Parameters		
Parameters	Type	Where Typedef Declared
*safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Errors		
Error Name	Reason for Error	
ERROR_OUT	No go away function for remote type	

Calls	
Function	Where Described
saf_vehicle_go_away	Sec. 2.6.1.1.2
remote_go_away	Sec. 2.7.1.3
composite_go_away	Sec. 2.8.1.3.2
ERROR OUT	Sec. 2.5.2.2

Table 2.14-6: go\_away CSU [8.14.1.1.6]

## 2.14.1.1.7 set\_targeting\_parameters CSU

This CSU sets targeting parameters based on SAF type.

Parameters		
Parameters	Type	Where Typedef Declared
*safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
firestatus	int	Standard
max_engagement_range	REAL	sim_types.h
marksmanship	REAL	sim_types.h
position_x	REAL	sim_types.h
position_y	REAL	sim_types.h
radius	REAL	sim_types.h
targets[ ]	unsigned short	Standard
Errors		
Error Name	Reason for Error	
ERROR_OUT	Cannot set targeting parameters for remote vehicle	
ERROR_OUT	No set targeting parameters for SAF type	
Calls		
Function	Where Described	
saf_vehicle_set_targeting_parameters	Sec. 2.6.1.1.12	
ERROR_OUT	Sec. 2.5.2.2	
OBJ_VEHICLEID	Sec. 2.9.1.1	
composite_set_targeting_parameters	Sec. 2.8.1.3.31	

Table 2.14-7: set\_targeting\_parameters CSU [8.14.1.1.7]

## 2.14.1.1.8 execute\_overlay CSU

This CSU executes an overlay for a local vehicle or composite based on SAF type.

Parameters		
Parameters	Type	Where Typedef Declared
*safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
*overlay	pointer to OVERLAY	
*cm	pointer to CONTROL MEASURE	

Errors	
Error Name	Reason for Error
ERROR_OUT	No execute overlay function for SAF type
Calls	
Function	Where Described
saf_vehicle_execute_overlay	Sec. 2.6.1.1.46
composite_execute_overlay	Sec. 2.8.1.3.40
ERROR_OUT	Sec. 2.5.2.2

Table 2.14-8: execute\_overlay CSU [8.14.1.1.8]

## 2.14.1.1.9 readjust\_overlay CSU

This CSU readjusts an overlay for a local vehicle or composite based on SAF type.

Parameters		
Parameters	Type	Where Typedef Declared
*safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
*overlay	pointer to OVERLAY	
Errors		
Error Name	Reason for Error	
ERROR_OUT	No readjust overlay function for SAF type	
Calls		
Function	Where Described	
OBJ_VEHICLEID	Sec. 2.9.1.1	
composite_readjust_overlay	Sec. 2.8.1.3.41	
ERROR_OUT	Sec. 2.5.2.2	

Table 2.14-9: readjust\_overlay CSU [8.14.1.1.9]

## 2.14.1.1.10 cancel\_overlay CSU

This CSU cancels an overlay for a local vehicle or composite based on SAF type.

Parameters		
Parameters	Type	Where Typedef Declared
*safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Errors		
Error Name	Reason for Error	
ERROR_OUT	No cancel overlay function for SAF type	

Calls	
Function	Where Described
saf_vehicle_cancel_overlay	Sec. 2.6.1.1.47
composite_cancel_overlay	Sec. 2.8.1.3.42
ERROR_OUT	Sec. 2.5.2.2

Table 2.14-10: cancel\_overlay CSU [8.14.1.1.10]

#### 2.14.1.1.11 generate\_status\_report CSU

This CSU generates a status report for a local vehicle or composite based on SAF type.

Parameters		
Parameters	Type	Where Typedef Declared
*safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Errors		
Error Name	Reason for Error	
ERROR_OUT	No generate status report function for SAF type	
Calls		
Function	Where Described	
saf_vehicle_generate_status_report	Sec. 2.6.1.1.34	
composite_generate_status_report	Sec. 2.8.1.3.33	
ERROR_OUT	Sec. 2.5.2.2	

Table 2.14-11: generate\_status\_report CSU [8.14.1.1.11]

#### 2.14.1.1.12 fake\_resupply CSU

This CSU fakes the resupply of a local vehicle or composite based on SAF type.

Parameters		
Parameters	Type	Where Typedef Declared
*safobj	pointer to SAF_OBJECT	Sec. 2.9.1.1
Errors		
Error Name	Reason for Error	
ERROR_OUT	No fake resupply function for SAF type	
Calls		
Function	Where Described	
saf_vehicle_fake_resupply	Sec. 2.6.1.1.33	
composite_fake_resupply	Sec. 2.8.1.3.32	
ERROR_OUT	Sec. 2.5.2.2	

Table 2.14-12: fake\_resupply CSU [8.14.1.1.12]



### 2.14.1.2 misc.c CSC

/simnet/src/host/misc.c

This CSC contains various CSUs involving inquiries to the terrain database.

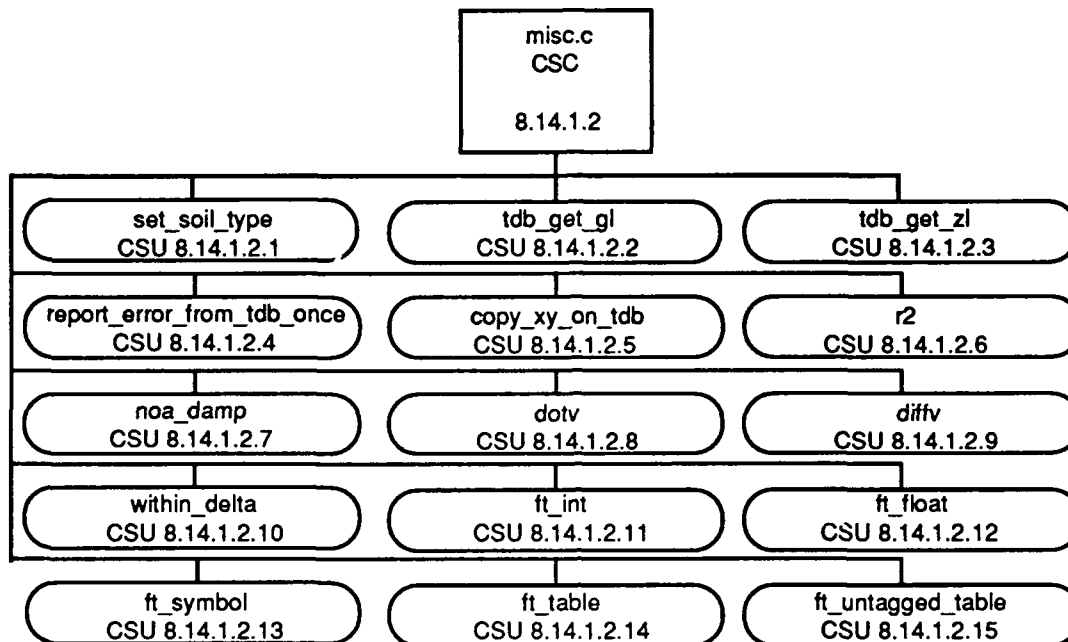


Figure 2.14-3: misc.c CSC Structure

#### 2.14.1.2.1 get\_soil\_type CSU

This CSU returns the soil type for the vector passed, as long as the vector is within the defined world.

Parameters		
Parameters	Type	Where Typedef Declared
vec	VECTOR	sim_types.h
ReturnValues		
Return Value	Type	Meaning
ret	int	Soil type
SOIL NA	int	Soil not available
Errors		
Error Name	Reason for Error	
return(SOIL NA)	Vector outside world	

Calls	
Function	Where Described
vec_copy	Sec. 2.6.2.59.1 Vehicles CSCI SDD
coords_within_database	Sec. 2.13.3.1
tdb_get_z	Sec. 21.7.16.2 MCC CSCI SDD
report_error_from_tdb_once	Sec. 2.14.1.2.4

Table 2.14-13: get\_soil\_type CSU [8.14.1.2.1]

## 2.14.1.2.2 tdb\_get\_gl CSU

This routine finds the ground level.

Parameters		
Parameters	Type	Where Typedef Declared
*vec	pointer to REAL	sim_types.h
Calls		
Function	Where Described	
coords_within_database	Sec. 2.13.3.1	
tdb_get_z	Sec. 2.21.7.16.2 MCC CSCI SDD	
report_error_from_tdb_once	Sec. 2.14.1.2.4	

Table 2.14-14: tdb\_get\_gl CSU [8.14.1.2.2]

## 2.14.1.2.3 tdb\_get\_zl CSU

This routine finds the height above ground.

Parameters		
Parameters	Type	Where Typedef Declared
*vec	pointer to REAL	sim_types.h
Calls		
Function	Where Described	
coords_within_database	Sec. 2.13.3.1	
tdb_get_z	Sec. 2.21.7.16.2 MCC CSCI SDD	
report_error_from_tdb_once	Sec. 2.14.1.2.4	

Table 2.14-15: tdb\_get\_zl CSU [8.14.1.2.3]

**2.14.1.2.4 report\_error\_from\_tdb\_once CSU**

This routine generates an error report for the terrain database functions.

Parameters		
Parameters	Type	Where Typedef Declared
*vec	pointer to REAL	sim_types.h
Errors		
Error Name	Reason for Error	
ERROR_OUT	Error from libtdb	
ERROR_OUT	Error from tdb	
Calls		
Function	Where Described	
ERROR_OUT	Sec. 2.5.2.2	
tdb_error	2.21.17.7.1 MCC CSCI SDD	

Table 2.14-16: report\_error\_from\_tdb\_once CSU [8.14.1.2.4]

**2.14.1.2.5 copy\_xy\_on\_tdb CSU**

This routine copies a coordinate into the terrain database.

Parameters		
Parameters	Type	Where Typedef Declared
position	VECTOR	sim_types.h
replace	VECTOR	sim_types.h

Table 2.14-17: copy\_xy\_on\_tdb CSU [8.14.1.2.5]

**2.14.1.2.6 r2 CSU**

This CSU returns the sum of the square of the differences of the two "x" and "y" values passed.

Parameters		
Parameters	Type	Where Typedef Declared
x1	REAL	sim_types.h
y1	REAL	sim_types.h
x2	REAL	sim_types.h
y2	REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
(dx*dx+dy*dy)	REAL	Sum of squared differences

Table 2.14-18: r2 CSU [8.14.1.2.6]

**2.14.1.2.7 noa\_damp CSU**

This CSU returns a dampened value for delta\_z, if delta\_z is greater than or equals -6.0.

Parameters		
Parameters	Type	Where Typedef Declared
delta_z	REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
$(-\sqrt{-6.0 \cdot \text{delta\_z}})$	int	Dampened value
delta_z	int	delta_z greater than or equal to -6.0

Table 2.14-19: noa\_damp CSU [8.14.1.2.7]

**2.14.1.2.8 dotv CSU**

This CSU computes the dot product ("result" sum) of the "x" and "y" values of two "n" element vectors.

Parameters		
Parameters	Type	Where Typedef Declared
x[]	REAL	sim_types.h
ry[]	REAL	sim_types.h
n	int	Standard
ReturnValues		
Return Value	Type	Meaning
result	REAL	Dot product

Table 2.14-20: dotv CSU [8.14.1.2.8]

**2.14.1.2.9 diffv CSU**

This CSU compute: the "r" differences of "x" and "y" values of two "n" element vectors.

Parameters		
Parameters	Type	Where Typedef Declared
x[]	REAL	sim_types.h
y[]	REAL	sim_types.h
r[]	REAL	sim_types.h
n	int	Standard

Table 2.14-21: diffv CSU [8.14.1.2.9]

**2.14.1.2.10 within\_delta CSU**

This CSU tests for the tolerance of a point, either two dimensional (as with a tank) or three dimensional (as with a plane), depending on the number of dimensions passed in "dims".

Parameters		
Parameters	Type	Where Typedef Declared
start[ ]	REAL	sim_types.h
finish[ ]	REAL	sim_types.h
goal[ ]	REAL	sim_types.h
delta2	REAL	sim_types.h
dims	int	Standard
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Point within delta
FALSE	int	Point not within delta
Calls		
Function	Where Described	
diffv	Sec. 2.14.1.2.9	
dotv	Sec. 2.14.1.2.8	

Table 2.14-22: within\_delta CSU [8.14.1.2.10]

**2.14.1.2.11 ft\_int CSU**

This CSU tries to find an integer tag through a call to find\_tag.

Parameters		
Parameters	Type	Where Typedef Declared
*symbol	pointer to char	Standard
*table	pointer to DATA_UNION	Sec 2.1.1.5
ReturnValues		
Return Value	Type	Meaning
0	int	No tag found
result[2].integer	int	Results
Calls		
Function	Where Described	
find_tag	Sec. 2.1.1.4.3	

Table 2.14-23: ft\_int CSU [8.14.1.2.11]

**2.14.1.2.12 ft\_float CSU**

This CSU tries to find a float tag through a call to find\_tag.

Parameters		
Parameters	Type	Where Typedef Declared
*symbol	pointer to char	Standard
*table	pointer to DATA_UNION	Sec 2.1.1.5
ReturnValues		
Return Value	Type	Meaning
0	real	No tag found
result[2].ral	real	Results
Calls		
Function	Where Described	
find_tag	Sec. 2.1.1.4.3	

Table 2.14-24: ft\_float CSU [8.14.1.2.12]

**2.14.1.2.13 ft\_symbol CSU**

This CSU tries to find a symbol (character) tag through a call to find\_tag.

Parameters		
Parameters	Type	Where Typedef Declared
*symbol	pointer to char	Standard
*table	pointer to DATA_UNION	Sec 2.1.1.5
ReturnValues		
Return Value	Type	Meaning
0	pointer to char	No tag found
result[2].charptr	pointer to char	Results
Calls		
Function	Where Described	
find_tag	Sec. 2.1.1.4.3	

Table 2.14-25: ft\_symbol CSU [8.14.1.2.13]

**2.14.1.2.14 ft\_table CSU**

This CSU tries to find a tagged table tag through a call to find\_tag.

Parameters		
Parameters	Type	Where Typedef Declared
*symbol	pointer to char	Standard
*table	pointer to DATA_UNION	Sec 2.1.1.5

ReturnValues		
Return Value	Type	Meaning
0	pointer to DATA_UNION	No tag
result	pointer to DATA_UNION	Pointer to tag
Calls		
Function	Where Described	
find_tag	Sec. 2.1.1.4.3	

Table 2.14-26: ft\_table CSU [8.14.1.2.14]

## 2.14.1.2.15 ft\_untagged\_table CSU

This CSU tries to find an untagged table tag through a call to find\_tag.

Parameters		
Parameters	Type	Where Typedef Declared
*symbol	pointer to char	Standard
*table	pointer to DATA_UNION	Sec 2.1.1.5
ReturnValues		
Return Value	Type	Meaning
0	pointer to DATA_UNION	No tag
result	pointer to DATA_UNION	Pointer to tag
Calls		
Function	Where Described	
find_tag	Sec. 2.1.1.4.3	

Table 2.14-27: ft\_untagged\_table CSU [8.14.1.2.15]

## 2.14.2 libheap CSC

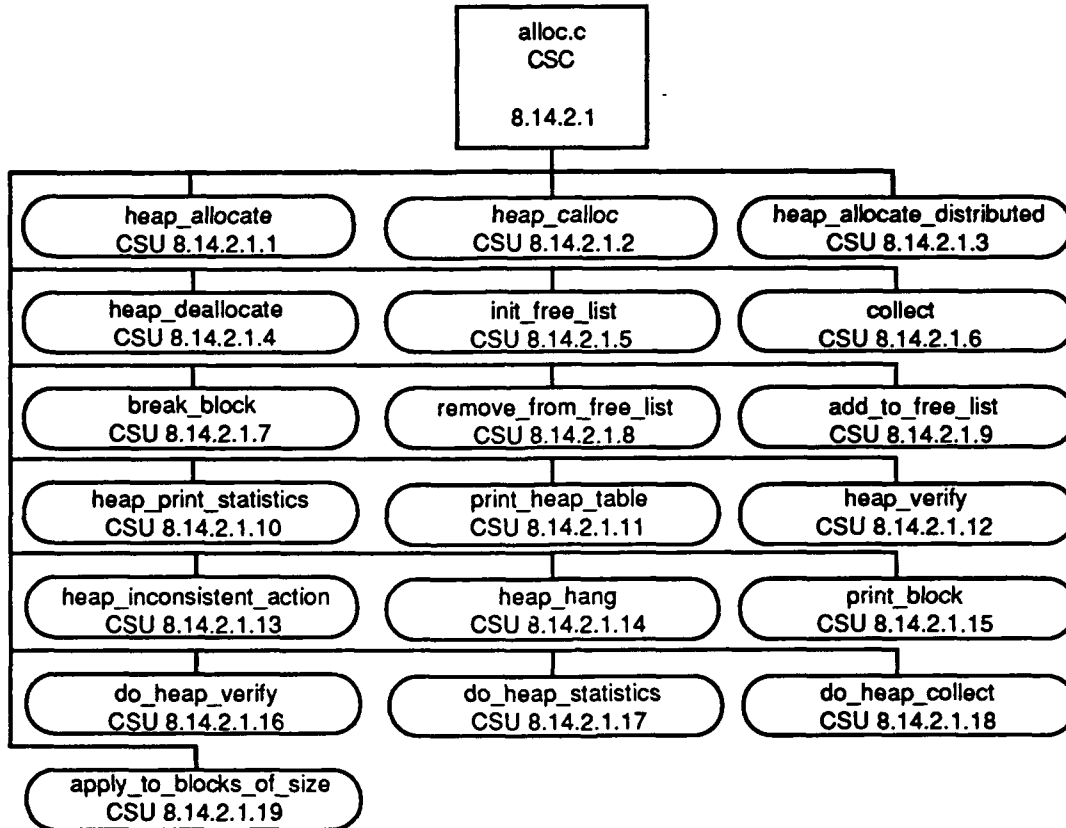
/simnet/libsrc/libheap

This library speeds up the program by making storage allocation much faster. Instead of handling dynamic storage requests during the execution of the program, which is relatively slow, the program grabs a large chunk of code at start up time, and gives out pieces as they come to be needed. This code also handles the deallocation of the previously requested space, and does it's own garbage collection.

**2.14.2.1 alloc.c CSC**

/simnet/libsrc/libheap/alloc.c

This CSC contains CSUs which handle heap allocation.

**Figure 2.14-4: misc.c CSC Structure**

This CSC contains the following constant definitions.

Constant	Value
FALSE	0
TRUE	1
YES FREE	0xf0f0f0f0
NOT FREE	0xfafafafafa
IN FREE LIST	0x20202020
USED BLOCK NEXT FLAG	0x00000042

**Table 2.14-28: alloc.c Constant Definitions**



**2.14.2.1.1 heap\_allocate CSU**

This CSU allocates a block of memory and initializes it.

Parameters		
Parameters	Type	Where Typedef Declared
size	int	Standard
ReturnValues		
Return Value	Type	Meaning
NULL	pointer to char	Ran out of heap
((char*)((int)free_block + sizeof(BLOC_HEADER	pointer to char	Pointer to block if USE BBN HEAP defined
((char*)malloc(size))	pointer to char	Block allocated if USE BBN HEAP not defined
Calls		
Function	Where Described	
heap_inconsistent_action	Sec. 2.14.2.1.13	
heap_print_statistics	Sec. 2.14.2.1.10	
collect	Sec. 2.14.2.1.6	
remove_from_free_list	Sec. 2.14.2.1.8	
add_to_free_list	Sec. 2.14.2.1.9	
break_block	Sec. 2.14.2.1.7	

**Table 2.14-29: heap\_allocate CSU [8.14.2.1.1]**

**2.14.2.1.2 heap\_calloc CSU**

This routine returns a pointer to a block of memory.

Parameters		
Parameters	Type	Where Typedef Declared
count	int	Standard
size of each	int	Standard
ReturnValues		
Return Value	Type	Meaning
p	pointer to char	Pointer to heap if USE BBN HEAP defined
((char*)calloc (count,size of each)	pointer to char	Pointer to heap if USE BBN HEAP not defined

**Table 2.14-30: heap\_calloc CSU [8.14.2.1.2]**

**2.14.2.1.3 heap\_allocate\_distributed CSU**

This CSU calls heap\_allocate. It returns a pointer to the location of a block of memory that has been allocated.

Parameters		
Parameters	Type	Where Typedef Declared
size	int	Standard
ReturnValues		
Return Value	Type	Meaning
(heap_allocate(size))	pointer to char	Pointer to heap allocated
Calls		
Function	Where Described	
heap_allocate	Sec. 2.14.2.1.1	

**Table 2.14-31: heap\_allocate\_distributed CSU [8.14.2.1.3]**

**2.14.2.1.4 heap\_deallocate CSU**

This CSU deallocates a block of memory.

Parameters		
Parameters	Type	Where Typedef Declared
*space	pointer to char	Standard
Calls		
Function	Where Described	
add_to_free_list	Sec. 2.14.2.1.9	
heap_inconsistent_action	Sec. 2.14.2.1.13	

**Table 2.14-32: heap\_deallocate CSU [8.14.2.1.4]**

**2.14.2.1.5 init\_free\_list CSU**

This routine initializes the pointers to the free memory.

Parameters		
Parameters	Type	Where Typedef Declared
*data space	pointe to char	Standard
size	int	Standard
ReturnValues		
Return Value	Type	Meaning
free_block	pointer to BLOCK_HEADER	Point to block

**Table 2.14-33: init\_free\_list CSU [8.14.2.1.5]**

**2.14.2.1.6 collect CSU**

This CSU goes through the block area and collects free blocks of memory into larger blocks of memory.

Calls	
Function	Where Described
NEXT_BLOCK	Sec. 2.14.2.3
add_to_free_list	Sec. 2.14.2.1.9
heap_inconsistent_action	Sec. 2.14.2.1.13

**Table 2.14-34: collect CSU [8.14.2.1.6]**

**2.14.2.1.7 break\_block CSU**

This CSU breaks a block into two pieces. The first piece is of size "size". It returns the second piece, or NULL if it can't break the block.

Parameters		
Parameters	Type	Where Typedef Declared
*block	pointer to BLOCK_HEADER	Sec. 2.14.2.3
size	int	Standard
ReturnValues		
Return Value	Type	Meaning
NULL	pointer to BLOCK_HEADER	Can't break block
new_block	pointer to BLOCK_HEADER	Pointer to second piece

**Table 2.14-35: break\_block CSU [8.14.2.1.7]**

**2.14.2.1.8 remove\_from\_free\_list CSU**

This routine removes a block of free memory from the list of available memory blocks.

Parameters		
Parameters	Type	Where Typedef Declared
*prev	pointer to BLOCK_HEADER	Sec. 2.14.2.3
*block	pointer to BLOCK_HEADER	Sec. 2.14.2.3

**Table 2.14-36: remove\_from\_free\_list CSU [8.14.2.1.8]**

**2.14.2.1.9 add\_to\_free\_list CSU**

This routine adds a block of free memory to the list of available memory blocks.

Parameters		
Parameters	Type	Where Typedef Declared
*block	pointer to BLOCK_HEADER	Sec. 2.14.2.3

**Table 2.14-37: add\_to\_free\_list CSU [8.14.2.1.9]**

The following constant was defined at this point in the file for use with the heap statistic.

Constant	Value
TABLE_SIZE	512

Table 2.14-38: TABLE\_SIZE Constant Definition

#### 2.14.2.1.10 heap\_print\_statistics CSU

This CSU prints the statistics concerning the heap.

Parameters		
Parameters	Type	Where Typedef Declared
long_version	int	Standard
Calls		
Function	Where Described	
heap_inconsistent_action	Sec. 2.14.2.1.13	
NEXT_BLOCK	Sec. 2.14.2.3	
print_heap_table	Sec. 2.14.2.1.11	

Table 2.14-39: heap\_print\_statistics CSU [8.14.2.1.10]

#### 2.14.2.1.11 print\_heap\_table CSU

This CSU prints the heap table's statistics.

Parameters		
Parameters	Type	Where Typedef Declared
*table	pointer to char	Standard

Table 2.14-40: print\_heap\_table CSU [8.14.2.1.11]

#### 2.14.2.1.12 heap\_verify CSU

This routine checks the free list and verifies all of the blocks.

Calls	
Function	Where Described
print_block	Sec. 2.14.2.1.15
heap_hang	Sec. 2.14.2.1.14

Table 2.14-41: heap\_verify CSU [8.14.2.1.12]

**2.14.2.1.13 heap\_inconsistent\_action CSU**

This routine indicates that a block is corrupt.

Parameters		
Parameters	Type	Where Typedef Declared
*block	pointer to BLOCK HEADER	Sec. 2.14.2.3
Calls		
Function	Where Described	
print_block	Sec. 2.14.2.1.15	
heap_hang	Sec. 2.14.2.1.14	

**Table 2.14-42: heap\_inconsistent\_action CSU [8.14.2.1.13]**

**2.14.2.1.14 heap\_hang CSU**

This CSU continually prints out a heap error message, looping indefinitely for debugging purposes.

Calls	
Function	Where Described
getpid	Sec. 2.

**Table 2.14-43: heap\_hang CSU [8.14.2.1.14]**

**2.14.2.1.15 print\_block CSU**

This CSU prints previous and troubled block statistics, along with a passed message.

Parameters		
Parameters	Type	Where Typedef Declared
*block	pointer to BLOCK HEADER	Sec. 2.14.2.3
*prev	pointer to BLOCK HEADER	Sec. 2.14.2.3
*message	pointer to char	Standard

**Table 2.14-44: print\_block CSU [8.14.2.1.15]**

**2.14.2.1.16 do\_heap\_verify CSU**

If USE\_BBN\_HEAP is defined, this CSU verifies the heap through a call to heap\_verify.

Parameters		
Parameters	Type	Where Typedef Declared
n	int	Standard
Calls		
Function	Where Described	
heap_verify	Sec. 2.14.2.1.12	

**Table 2.14-45: do\_heap\_verify CSU [8.14.2.1.16]**

**2.14.2.1.17 do\_heap\_statistics CSU**

If USE\_BBN\_HEAP is defined, this CSU prints the heap statistics through a call to heap\_print\_statistics.

Parameters		
Parameters	Type	Where Typedef Declared
n	int	Standard
long_version	int	Standard
Calls		
Function	Where Described	
heap_print_statistics	Sec. 2.14.2.1.10	

Table 2.14-46: do\_heap\_statistics CSU [8.14.2.1.17]

**2.14.2.1.18 do\_heap\_collect CSU**

If USE\_BBN\_HEAP is defined, this CSU does a heap collect through a call to collect.

Parameters		
Parameters	Type	Where Typedef Declared
n	int	Standard
Calls		
Function	Where Described	
collect	Sec. 2.14.2.1.6	

Table 2.14-47: do\_heap\_collect CSU [8.14.2.1.18]

**2.14.2.1.19 apply\_to\_blocks\_of\_size CSU**

If USE\_BBN\_HEAP is defined, this CSU analyzes the memory blocks dependent on the function passed.

Parameters		
Parameters	Type	Where Typedef Declared
n	int	Standard
(*function)()	pointer to int	Standard
Calls		
Function	Where Described	
NEXT_BLOCK	Sec. 2.14.2.3	

Table 2.14-48: apply\_to\_blocks\_of\_size CSU [8.14.2.1.19]

### 2.14.2.2 create.c CSC

/simnet/libsrc/libheap/create.c

The CSUs in this CSC deal with heap creation and distruction.

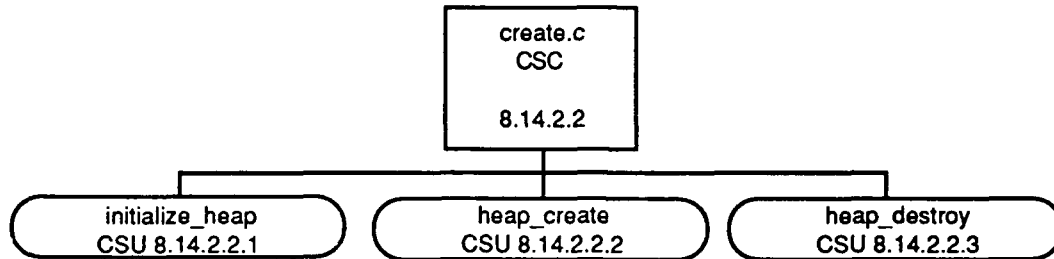


Figure 2.14-5: create.c CSC Structure

#### 2.14.2.2.1 initialize\_heap CSU

This CSU initializes a heap, passing in a pointer to its address, proc, and its size.

Parameters		
Parameters	Type	Where Typedef Declared
*address	pointer to char	Standard
proc	int	Standard
size	int	Standard
ReturnValues		
Return Value	Type	Meaning
1	int	
Calls		
Function	Where Described	
init_free_list	Sec. 2.14.2.1.5	

Table 2.14-49: CSU [8.14.2.2.1]

#### 2.14.2.2.2 heap\_create CSU

If USE\_BBN\_HEAP is defined, this CSU creates a shared heap.

ReturnValues		
Return Value	Type	Meaning
1	int	heap created
Calls		
Function	Where Described	
initialize_heap	Sec. 2.14.2.2.1	

Table 2.14-50: heap\_create CSU [8.14.2.2.2]

**2.14.2.2.3 heap\_destroy CSU**

If USE\_BBN\_HEAP is defined, this CSU destroys a shared heap.

ReturnValues		
Return Value	Type	Meaning
1	int	heap destroyed

**Table 2.14-51: heap\_destroy CSU [8.14.2.2.3]**

**2.14.2.3 libheap.h CSU**

/simnet/libsrc/libheap/libheap.h

This CSU contains the heap includes. Among these are the constant for the heap size, two structure definitions, and an expansion macro for NEXT\_BLOCK(block), the block after the current one. With the exception of the macro, defined in Appendix A, tables for these items follow.

Constant	Value
HEAP_SIZE /* 16 meg */	(16 * 1024 * 1024)

**Table 2.14-52: HEAP\_SIZE Constant Definition**

The following typedef struct is tagged block\_header.

Item	Type	Where Type Defined
free	int	Standard
size	int	Standard
*next	pointer to struct block_header	This typedef struct

**Table 2.14-53: BLOCK\_HEADER Structure Definition**

The following typedef struct is tagged heap.

Item	Type	Where Type Defined
*free_list	pointer to BLOCK_HEADER	The previous typedef struct
*heap_end	pointer to BLOCK_HEADER	The previous typedef struct
*data	pointer to BLOCK_HEADER	The previous typedef struct

**Table 2.14-54: HEAP Structure Definition**



### 2.14.3 libutil CSC

/simnet/libsrc/libutil

This library contains various utilities which are used by the simhost code.

#### 2.14.3.1 args.c CSC

/simnet/libsrc/libutil/args.c

The CSC contains a single CSU to process switch arguments.

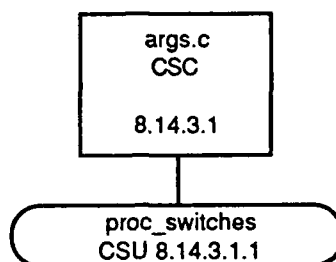


Figure 2.14-6: args.c CSC Structure

##### 2.14.3.1.1 proc\_switches CSU

This CSU processes switch arguments.

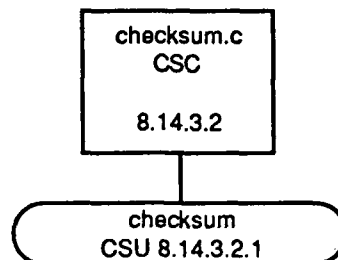
Parameters		
Parameters	Type	Where Typedef Declared
table[ ][3]	int	Standard
argc	int	Standard
*argv[ ]	pointer to char	Standard
ReturnValues		
Return Value	Type	Meaning
i	int	index corresponding to a switch.

Table 2.14-55: proc\_switches CSU [8.14.3.1.1]

**2.14.3.2 checksum.c CSC**

/simnet/libsrc/libutil/checksum.c

The CSC contains a single CSU to determine a checksum.

**Figure 2.14-7: checksum.c CSC Structure****2.14.3.2.1 checksum CSU**

This CSU calculates a checksum.

Parameters		
Parameters	Type	Where Typedef Declared
argc	pointer to register unsigned short	Standard
nbytes	int	Standard
ReturnValues		
Return Value	Type	Meaning
sum	unsigned short	Checksum

**Table 2.14-56: checksum CSU [8.14.3.2.1]**

### 2.14.3.3 time.c CSC

/simnet/libsrc/libutil/time.c

This CSC contains the macro `CONVERT_FROM_SIXTEENTH_TIME(time)` which divides the time value by shifting the bits down four places (see definition in Appendix A). In addition, it contains the following two CSUs. The manner of operation of these CSUs depend on whether CMU has been defined.

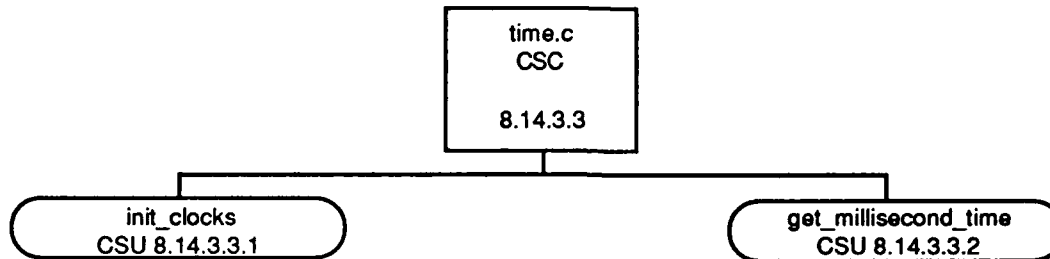


Figure 2.14-8: time.c CSC Structure

#### 2.14.3.3.1 init\_clocks CSU

If CMU is defined the `base_time_value` is determined by calling `getrtc` and dividing the returned binary value by 16, via four right bit shifts, using the macro `CONVERT_FROM_SIXTEENTH_TIME`. If not defined, a call to `ftime(&tloc)` provides a `base_time_value` equal to 1000 times `tloc.time` plus `tloc.millithm`.

Calls	
Function	Where Described
<code>CONVERT_FROM_SIXTEENTH_TIME</code>	Sec. 2.2.14.3.3

Table 2.14-57: init\_clocks CSU [8.14.3.3.1]

#### 2.14.3.3.2 get\_millisecond\_time CSU

If CMU is defined, the `g_last_millisecond_time` is returned by calling `getrtc`, subtracting the `base_time_value`, and dividing the resultant binary value by 16, via four right bit shifts, using the macro `CONVERT_FROM_SIXTEENTH_TIME`. If CMU is not defined, the `g_last_millisecond_time` is returned by calling `ftime(&tloc)`. `g_last_millisecond_time` is 1000 times `tloc.time` plus `tloc.millithm`, minus the `base_time_value`.

ReturnValues		
Return Value	Type	Meaning
<code>g_last_millisecond_time</code>	unsigned int	Time in milliseconds
Calls		
Function	Where Described	
<code>CONVERT_FROM_SIXTEENTH_TIME</code>	Sec. 2.2.14.3.3	

Table 2.14-58: get\_millisecond\_time CSU [8.14.3.3.2]

### 2.14.3.4 bitfield.c CSC

/simnet/libsrc/libutil/bitfield.c

This CSC contains bitfield CSUs.

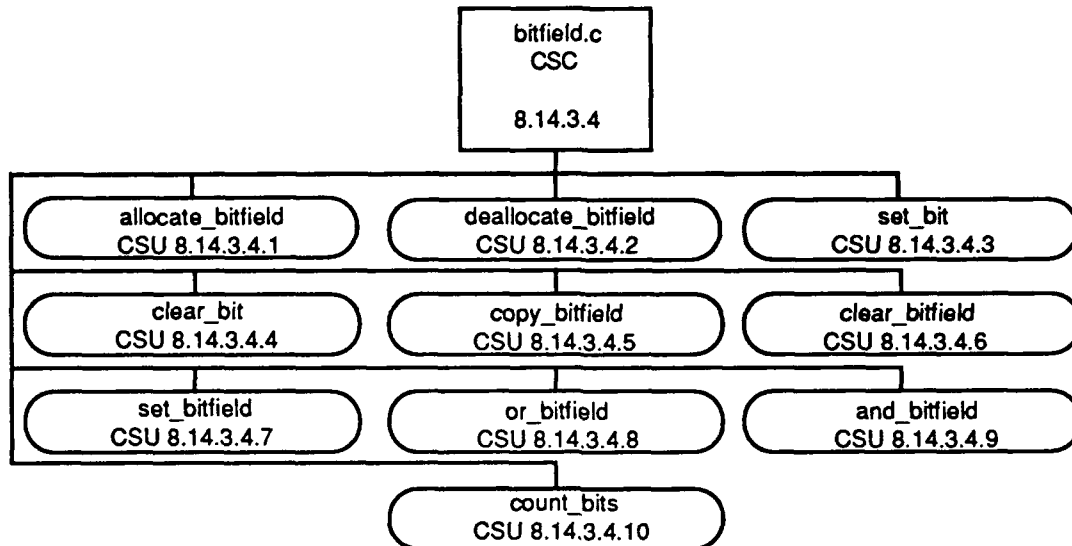


Figure 2.14-9: bitfield.c CSC Structure

#### 2.14.3.4.1 allocate\_bitfield CSU

This CSU allocates a bitfield through a call to heap\_allocate and clears the memory.

Parameters		
Parameters	Type	Where Typedef Declared
size	int	Standard
ReturnValues		
Return Value	Type	Meaning
a	pointer to unsigned char	Allocated bitfield
Calls		
Function	Where Described	
heap_allocate	Sec. 2.14.2.1.1	

Table 2.14-59: allocate\_bitfield CSU [8.14.3.4.1]

**2.14.3.4.2 deallocate\_bitfield CSU**

This CSU releases a bitfield through a call to heap\_deallocate.

Parameters		
Parameters	Type	Where Typedef Declared
*x	pointer to unsigned char	Standard
Calls		
Function	Where Described	
heap_deallocate	Sec. 2.14.2.1.4	

**Table 2.14-60: deallocate\_bitfield CSU [8.14.3.4.2]**

**2.14.3.4.3 set\_bit CSU**

This CSU sets a bit in a bitfield.

Parameters		
Parameters	Type	Where Typedef Declared
bit_num	int	Standard
*bitfield	pointer to unsigned char	Standard

**Table 2.14-61: set\_bit CSU [8.14.3.4.3]**

**2.14.3.4.4 clear\_bit CSU**

This CSU clears a bit in a bitfield.

Parameters		
Parameters	Type	Where Typedef Declared
bit_num	int	Standard
*bitfield	pointer to unsigned char	Standard

**Table 2.14-62: clear\_bit CSU [8.14.3.4.4]**

**2.14.3.4.5 copy\_bitfield CSU**

This CSU copies the contents of one portion of a bitfield to another.

Parameters		
Parameters	Type	Where Typedef Declared
*src	pointer to unsigned char	Standard
*dest	pointer to unsigned char	Standard
size	int	Standard

**Table 2.14-63: copy\_bitfield CSU [8.14.3.4.5]**

**2.14.3.4.6 clear\_bitfield CSU**

This CSU clears a length (size) of a bitfield through a call to bzero.

Parameters		
Parameters	Type	Where Typedef Declared
*src	pointer to unsigned char	Standard
size	int	Standard

**Table 2.14-64: clear\_bitfield CSU [8.14.3.4.6]**

**2.14.3.4.7 set\_bitfield CSU**

This CSU sets a bitfield by writing 0xFF into each byte.

Parameters		
Parameters	Type	Where Typedef Declared
*src	pointer to unsigned char	Standard
size	int	Standard

**Table 2.14-65: set\_bitfield CSU [8.14.3.4.7]**

**2.14.3.4.8 or\_bitfield CSU**

This CSU ORs two source bitfields and places the results in a destination bitfield.

Parameters		
Parameters	Type	Where Typedef Declared
*src1	pointer to unsigned char	Standard
*src2	pointer to unsigned char	Standard
*dest	pointer to unsigned char	Standard
size	int	Standard

**Table 2.14-66: or\_bitfield CSU [8.14.3.4.8]**

**2.14.3.4.9 and\_bitfield CSU**

This CSU ANDs two source bitfields and places the results in a destination bitfield.

Parameters		
Parameters	Type	Where Typedef Declared
*src1	pointer to unsigned char	Standard
*src2	pointer to unsigned char	Standard
*dest	pointer to unsigned char	Standard
size	int	Standard

**Table 2.14-67: and\_bitfield CSU [8.14.3.4.9]**

**2.14.3.4.10 count\_bits CSU**

This routine returns the number of bits counted.

Parameters		
Parameters	Type	Where Typedef Declared
size	int	Standard
*bitfield	pointer to unsigned char	Standard
ReturnValues		
Return Value	Type	Meaning
count	int	Number of bits

**Table 2.14-68: count\_bits CSU [8.14.3.4.10]**

## 2.14.3.5 math.c CSC

/simnet/libsrc/libutil/math.c

This CSC consists of a number of math CSUs.

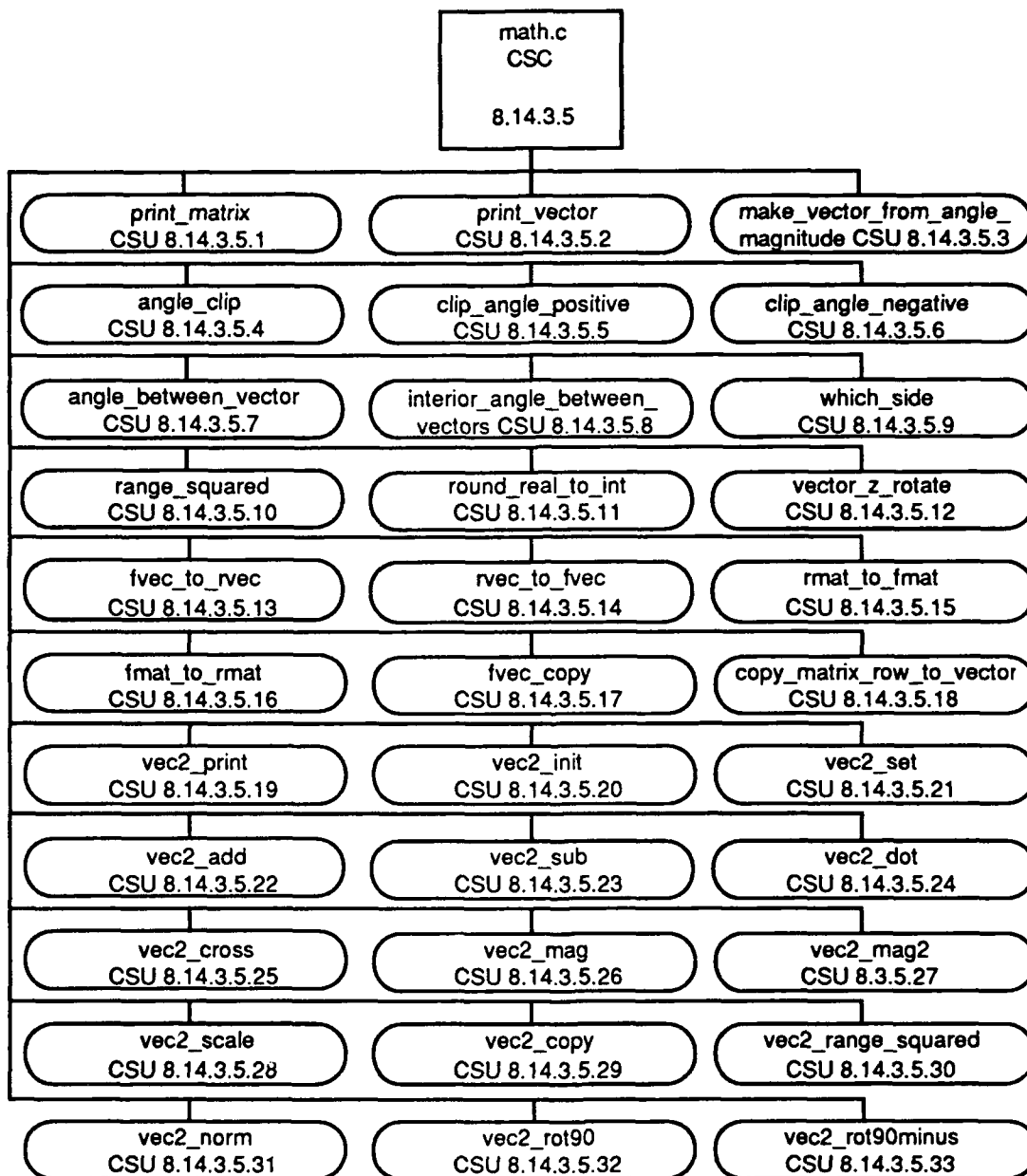


Figure 2.14-10: math.c CSC Structure



**2.14.3.5.1 print\_matrix CSU**

This CSU prints the values in a 3 by 3 T\_MATRIX passed as the parameter.

Parameters		
Parameters	Type	Where Typedef Declared
m	T_MATRIX	sim_types.h

Table 2.14-69: print\_matrix CSU [8.14.3.5.1]

**2.14.3.5.2 print\_vector CSU**

This CSU prints the 3 values in a VECTOR passed as the sole parameter.

Parameters		
Parameters	Type	Where Typedef Declared
v	VECTOR	sim_types.h

Table 2.14-70: print\_vector CSU [8.14.3.5.2]

**2.14.3.5.3 make\_vector\_from\_angle\_magnitude CSU**

This CSU creates a vector by multiplying the sine (for X) and cosine (for Y) of the angle by the magnitude.

Parameters		
Parameters	Type	Where Typedef Declared
theta	REAL	sim_types.h
mag	REAL	sim_types.h
result	VECTOR	sim_types.h

Table 2.14-71: make\_vector\_from\_angle\_magnitude CSU [8.14.3.5.3]

**2.14.3.5.4 angle\_clip CSU**

This CSU returns 0.0 if the angle passed is 30.0 degrees or greater.

Parameters		
Parameters	Type	Where Typedef Declared
angle	REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
0.0	REAL	angle is 30° or greater

Table 2.14-72: angle\_clip CSU [8.14.3.5.4]

**2.14.3.5.5 clip\_angle\_positive CSU**

This CSU adjusts an angle in two pi increments until it becomes between zero and two pi.

Parameters		
Parameters	Type	Where Typedef Declared
angle	REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
angle	REAL	Resulting angle

**Table 2.14-73: clip\_angle\_positive CSU [8.14.3.5.5]**

**2.14.3.5.6 clip\_angle\_negative CSU**

This CSU adjusts an angle in two pi increments until it becomes between zero and minus two pi.

Parameters		
Parameters	Type	Where Typedef Declared
angle	REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
angle	REAL	Resulting angle

**Table 2.14-74: clip\_angle\_negative CSU [8.14.3.5.6]**

**2.14.3.5.7 angle\_between\_vectors CSU**

This CSU returns the angle, along with sign formed by two vectors.

Parameters		
Parameters	Type	Where Typedef Declared
v1	VECTOR	sim_types.h
v2	VECTOR	sim_types.h
ReturnValues		
Return Value	Type	Meaning
(which_side(v1,v2) * interior_angle_between_vectors(v1,v2))	REAL	Signed angle between two vectors
Calls		
Function	Where Described	
which_side	Sec. 2.14.3.5.9	
interior_angle_between_vectors	Sec. 2.14.3.5.8	

**Table 2.14-75: angle\_between\_vectors CSU [8.14.3.5.7]**

**2.14.3.5.8 interior\_angle\_between\_vectors CSU**

This CSU returns 1 if vec2 is left of vec1, -1 if vec2 is right of vec1, and 0 if vec2 is colinear with vec1.

Parameters		
Parameters	Type	Where Typedef Declared
*vec1	pointer to REAL	sim_types.h
*vec2	pointer to REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
(0.0)	REAL	vec2 is colinear with vec1
(acos(RANGE_CLIP(-1.0, quot, 1.0)))	REAL	1 if vec2 is left of vec1 -1 if vec2 is right of vec1
Calls		
Function	Where Described	
almost_eq	Sec. 2.14.3.9	
RANGE_CLIP	Sec. 2.14.3.9	

Table 2.14-76: interior\_angle\_between\_vectors CSU [8.14.3.5.8]

**2.14.3.5.9 which\_side CSU**

This CSU returns the sign of the difference of two cross multiplied vectors: 1 if vec2 is left of vec1; -1 if vec2 is right of vec1; and 0 if the two vectors are colinear.

Parameters		
Parameters	Type	Where Typedef Declared
*vec1	pointer to REAL	sim_types.h
*vec2	pointer to REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
(sign(vec2[Y]*vec1[X] - vec2[X]*vec1[Y]))	int	1 if vec2 is left of vec1; -1 if vec2 is right of vec1; and 0 if the two vectors are colinear

Table 2.14-77: which\_side CSU [8.14.3.5.9]

**2.14.3.5.10 range\_squared CSU**

This CSU returns the sum of the squares of the differences of two, three element vectors.

Parameters		
Parameters	Type	Where Typedef Declared
*vec1	pointer to register REAL	sim_types.h
*vec2	pointer to register REAL	sim_types.h

ReturnValues		
Return Value	Type	Meaning
(square(delta_x) + square(delta_y) + square(delta_z))	REAL	sum of the squares of the differences of two vectors

Table 2.14-78: range\_squared CSU [8.14.3.5.10]

## 2.14.3.5.11 round\_real\_to\_int CSU

This CSU converts a REAL into a rounded integer.

Parameters		
Parameters	Type	Where Typedef Declared
*value	pointer to REAL	sim_types.h
angle	REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
(retval/modulus)	int	Rounded integer value

Table 2.14-79: round\_real\_to\_int CSU [8.14.3.5.11]

## 2.14.3.5.12 vector\_z\_rotate CSU

This CSU rotates a two dimensional vector by "angle" radians around the origin (with respect to the Z axis).

Parameters		
Parameters	Type	Where Typedef Declared
*vec	pointer to REAL	sim_types.h
angle	REAL	sim_types.h
Calls		
Function	Where Described	
mat rot init	Sec. 2.6.2.47.1 Vehicles CSCI SDD	
vec mat mul	Sec. 2.6.2.56.1 Vehicles CSCI SDD	

Table 2.14-80: vector\_z\_rotate CSU [8.14.3.5.12]

## 2.14.3.5.13 fvec\_to\_rvec CSU

This CSU converts a floating point vector to a REAL vector.

Parameters		
Parameters	Type	Where Typedef Declared
*float_vector	pointer to register float	Standard
*real_vector	pointer to register REAL	sim_types.h

Table 2.14-81: fvec\_to\_rvec CSU [8.14.3.5.13]

**2.14.3.5.14 rvec\_to\_fvec CSU**

This CSU converts a REAL vector to a floating point vector.

Parameters		
Parameters	Type	Where Typedef Declared
*real_vector	pointer to register REAL	sim_types.h
*float_vector	pointer to register float	Standard

**Table 2.14-82: rvec\_to\_fvec CSU [8.14.3.5.14]**

**2.14.3.5.15 rmat\_to\_fmat CSU**

This CSU converts a REAL matrix to a floating point matrix.

Parameters		
Parameters	Type	Where Typedef Declared
real mat[ ]	register REAL	sim_types.h
float mat[ ]	register float	Standard

**Table 2.14-83: rmat\_to\_fmat CSU [8.14.3.5.15]**

**2.14.3.5.16 fmat\_to\_rmat CSU**

This CSU converts a floating point matrix to a REAL matrix.

Parameters		
Parameters	Type	Where Typedef Declared
float mat[ ]	register float	Standard
real mat[ ]	register REAL	sim_types.h

**Table 2.14-84: fmat\_to\_rmat CSU [8.14.3.5.16]**

**2.14.3.5.17 fvec\_copy CSU**

This CSU copies the three values in the source vector into the destination vector.

Parameters		
Parameters	Type	Where Typedef Declared
*src_vec	pointer to register float	Standard
*dst_vec	pointer to register float	Standard

**Table 2.14-85: fvec\_copy CSU [8.14.3.5.17]**

**2.14.3.5.18      copy\_matrix\_row\_to\_vector CSU**

This CSU copies the three values in a matrix row into a vector.

Parameters		
Parameters	Type	Where Typedef Declared
src_mat	register T MATRIX	sim_types.h
row	register int	Standard
dst_vec	register VECTOR	sim_types.h

**Table 2.14-86:    copy\_matrix\_row\_to\_vector CSU [8.14.3.5.18]**

**2.14.3.5.19      vec2\_print CSU**

This and the remaining CSUs in this file deal with vectors. This one prints the two values x, the REAL pointer passed, and y, the REAL value pointed at by \*y.

Parameters		
Parameters	Type	Where Typedef Declared
*v	pointer to REAL	sim_types.h

**Table 2.14-87:    vec2\_print CSU [8.14.3.5.19]**

**2.14.3.5.20      vec2\_init CSU**

This CSU initiates the two values of a vector to zero.

Parameters		
Parameters	Type	Where Typedef Declared
v	VECTOR	sim_types.h

**Table 2.14-88:    vec2\_init CSU [8.14.3.5.20]**

**2.14.3.5.21      vec2\_set CSU**

This CSU set two values of a vector ( v[0] and v[1]) to x and y respectively.

Parameters		
Parameters	Type	Where Typedef Declared
v	VECTOR	sim_types.h
x	REAL	sim_types.h
y	REAL	sim_types.h

**Table 2.14-89:    vec2\_set CSU [8.14.3.5.21]**

**2.14.3.5.22      vec2\_add CSU**

This CSU adds the vector values in v1 and v2, placing the results in vr.

Parameters		
Parameters	Type	Where Typedef Declared
v1	VECTOR	sim_types.h
v2	VECTOR	sim_types.h
vr	VECTOR	sim_types.h

Table 2.14-90: vec2\_add CSU [8.14.3.5.22]

**2.14.3.5.23      vec2\_sub CSU**

This CSU subtracts the vector values in v2 from v1, putting the results in vr.

Parameters		
Parameters	Type	Where Typedef Declared
v1	VECTOR	sim_types.h
v2	VECTOR	sim_types.h
vr	VECTOR	sim_types.h

Table 2.14-91: vec2\_sub CSU [8.14.3.5.23]

**2.14.3.5.24      vec2\_dot CSU**

This routine returns the quantity which results when two vectors are multiplied and summed with the product of their z components.

Parameters		
Parameters	Type	Where Typedef Declared
*v1	pointer to REAL	sim_types.h
*v2	pointer to REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
*v1 * *v2 + v1[Y] * v2[Y]	REAL	See description above

Table 2.14-92: vec2\_dot CSU [8.14.3.5.24]

**2.14.3.5.25      vec2\_cross CSU**

This routine returns a value which is equal to the difference between the product of ref and the z component of v and the product of v and the z component of ref.

Parameters		
Parameters	Type	Where Typedef Declared
*ref	pointer to REAL	sim_types.h
*v	pointer to REAL	sim_types.h

ReturnValues		
Return Value	Type	Meaning
*ref * v[Y] - ref[Y] * *v	REAL	the value of this expression

Table 2.14-93: vec2\_cross CSU [8.14.3.5.25]

## 2.14.3.5.26 vec2\_mag CSU

This CSU returns the square root of the sum of the squares of the vector and magnitude.

Parameters		
Parameters	Type	Where Typedef Declared
*v	pointer to REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
$\text{sqrt}(*v * *v + v[Y] * v[Y])$	REAL	Square root of the sum of the squares of the vector and magnitude

Table 2.14-94: vec2\_mag CSU [8.14.3.5.26]

## 2.14.3.5.27 vec2\_mag2 CSU

This CSU returns the sum of the squares of the vector and magnitude.

Parameters		
Parameters	Type	Where Typedef Declared
*v	pointer to REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
$(*v * *v + v[Y] * v[Y])$	REAL	Sum of the squares of the vector and magnitude

Table 2.14-95: vec2\_mag2 CSU [8.14.3.5.27]

## 2.14.3.5.28 vec2\_scale CSU

This CSU multiplies the elements in vector v by s, placing the results in vector r.

Parameters		
Parameters	Type	Where Typedef Declared
v	VECTOR	sim_types.h
r	VECTOR	sim_types.h
s	REAL	sim_types.h

Table 2.14-96: vec2\_scale CSU [8.14.3.5.28]



**2.14.3.5.29      vec2\_copy CSU**

This CSU copies vector a to vector b.

Parameters		
Parameters	Type	Where Typedef Declared
a	VECTOR	sim_types.h
b	VECTOR	sim_types.h

**Table 2.14-97:    vec2\_copy CSU [8.14.3.5.29]**

**2.14.3.5.30      vec2\_range\_squared CSU**

This CSU returns the sum of the squares of the differences of the two vectors.

Parameters		
Parameters	Type	Where Typedef Declared
*vec1	pointer to register REAL	sim_types.h
*vec2	pointer to register REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
(square(delta_x) + square(delta_y))	REAL	Sum of the squares of the differences of the vectors

**Table 2.14-98:    vec2\_range\_squared CSU [8.14.3.5.30]**

**2.14.3.5.31      vec2\_norm CSU**

This CSU artificially normalizes a vector.

Parameters		
Parameters	Type	Where Typedef Declared
v	VECTOR	sim_types.h
r	VECTOR	sim_types.h
abort	int	Standard

**Table 2.14-99:    vec2\_norm CSU [8.14.3.5.31]**

**2.14.3.5.32      vec2\_rot90 CSU**

This CSU manipulates a vector.

Parameters		
Parameters	Type	Where Typedef Declared
*v	pointer to REAL	sim_types.h
*r	pointer to REAL	sim_types.h

**Table 2.14-100:    vec2\_rot90 CSU [8.14.3.5.32]**

### 2.14.3.5.33 vec2\_rot90minus CSU

This CSU manipulates a vector.

Parameters		
Parameters	Type	Where Typedef Declared
*v	pointer to REAL	sim_types.h
*r	pointer to REAL	sim_types.h

Table 2.14-101: vec2\_rot90minus CSU [8.14.3.5.33]

### 2.14.3.6 geometry.c CSC

/simnet/libsrc/libutil/geometry.c

This CSC contains geometry CSUs.

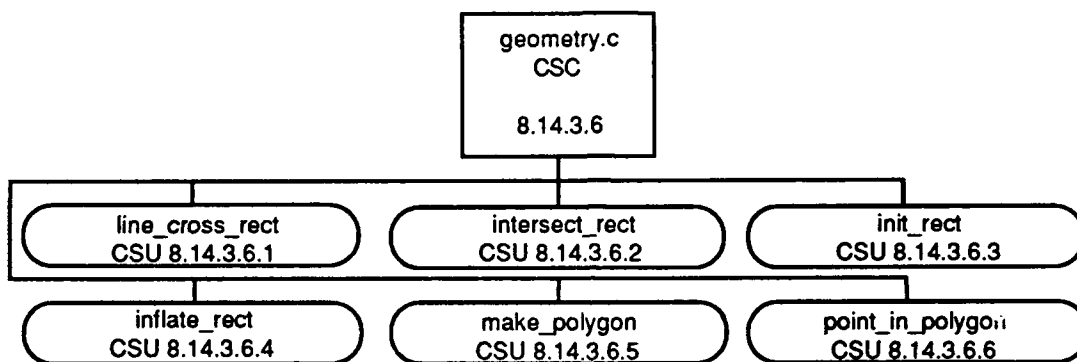


Figure 2.14-11: geometry.c CSC Structure

#### 2.14.3.6.1 line\_cross\_rect CSU

For a given position and destination, this CSU return TRUE if a line segment intersects a rectangle.

Parameters		
Parameters	Type	Where Typedef Declared
*pos	pointer to REAL	sim_types.h
*dest	pointer to REAL	sim_types.h
*rect_ptr	pointer to REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
TRUE	int	Line segment intersects rectangle
FALSE	int	Line segment doesn't intersect rectangle

Calls	
Function	Where Described
min	Sec. 2.6.7.3
max	Sec. 2.6.7.3
intersect_rect	Sec. 2.14.3.6.2

Table 2.14-102: line\_cross\_rect CSU [8.14.3.6.1]

## 2.14.3.6.2 intersect\_rect CSU

For two given rectangles, this CSU return TRUE if the rectangles intersect and returns FALSE otherwise.

Parameters		
Parameters	Type	Where Typedef Declared
*r1	pointer to RECT	Sec. 2.14.3.9
*r2	pointer to RECT	Sec. 2.14.3.9
ReturnValues		
Return Value	Type	Meaning
TRUE	int	rectangles intersected
FALSE	int	rectangles not intersected
Calls		
Function	Where Described	
min	Sec. 2.6.7.3	
max	Sec. 2.6.7.3	

Table 2.14-103: intersect\_rect CSU [8.14.3.6.2]

## 2.14.3.6.3 init\_rect CSU

This CSU sets all elements in a rectangle to zero.

Parameters		
Parameters	Type	Where Typedef Declared
*rect_ptr	pointer to RECT	Sec. 2.14.3.9

Table 2.14-104: init\_rect CSU [8.14.3.6.3]

## 2.14.3.6.4 inflate\_rect CSU

This CSU increases the sides of a rectangle, inflating it, by the "amount" passed.

Parameters		
Parameters	Type	Where Typedef Declared
*rect_ptr	pointer to RECT	Sec. 2.14.3.9
amount	REAL	sim_types.h

Table 2.14-105: inflate\_rect CSU [8.14.3.6.4]

**2.14.3.6.5 make\_polygon CSU**

This CSU creates a polygon.

Parameters		
Parameters	Type	Where Typedef Declared
num_vertices	int	Standard
array_rep[MAX_POLYGON_VERTICES][2]	register REAL	sim_types.h
*poly_rep	pointer to register POLYGON	Sec. 2.14.3.9

**Table 2.14-106: make\_polygon CSU [8.14.3.6.5]**

**2.14.3.6.6 point\_in\_polygon CSU**

This CSU determines if we are within a given polygon. A line segment is drawn from the current position to +infinity. If the line segment crosses an odd number of polygon line segments, then the current position is within the polygon.

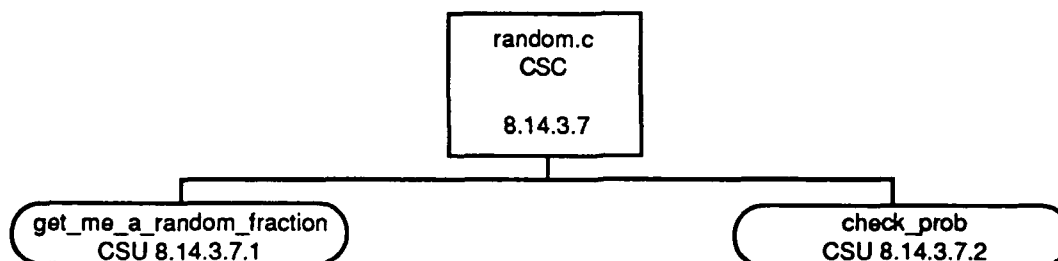
Parameters		
Parameters	Type	Where Typedef Declared
*point	pointer to register REAL	sim-types.h
*polygon	pointer to register POLYGON	Sec. 2.14.3.9
ReturnValues		
Return Value	Type	Meaning
FALSE	int	not within polygon
(num_crossed % 2)	int	if odd, within polygon if even, not within polygon
Calls		
Function	Where Described	
point_in_rect	Sec. 2.	

**Table 2.14-107: point\_in\_polygon CSU [8.14.3.6.6]**

**2.14.3.7 random.c CSC**

/simnet/libsrc/libutil/random.c

This CSC contains random number utilities.

**Figure 2.14-12: random.c CSC Structure****2.14.3.7.1 get\_me\_a\_random\_fraction CSU**

This CSU calls rand to get a random (short) number and divides it (in REAL form) by 65535 to get a random fraction.

ReturnValues		
Return Value	Type	Meaning
reandom_fraction	REAL	Random fraction

**Table 2.14-108: get\_me\_a\_random\_fraction CSU [8.14.3.7.1]****2.14.3.7.2 check\_prob CSU**

This CSU returns TRUE if the fraction passed is equal to or greater than the random fraction generated, else it return FALSE.

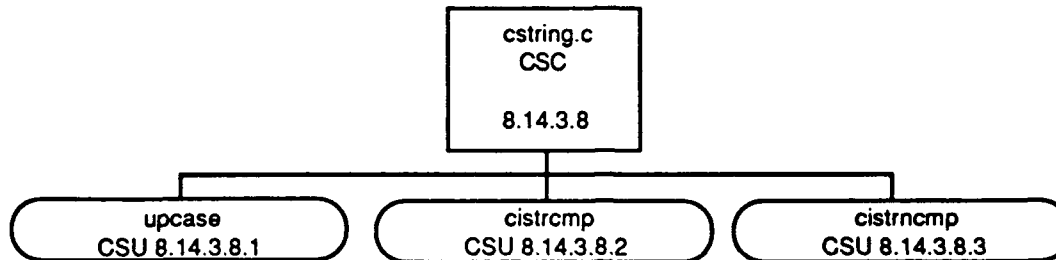
Parameters		
Parameters	Type	Where Typedef Declared
p	REAL	sim_types.h
ReturnValues		
Return Value	Type	Meaning
TRUE	int	p equal to or larger than random fraction
FALSE	int	p smaller than random fraction

**Table 2.14-109: check\_prob CSU [8.14.3.7.2]**

### 2.14.3.8 cstring.c CSC

/simnet/libsrc/libutil/cstring.c

This CSC contains case insensitive string utilities.



**Figure 2.14-13: cstring.c CSC Structure**

#### 2.14.3.8.1 upcase CSU

This CSU compares characters converting lower case alphabetic characters to upper case. Other characters are not changed.

Parameters		
Parameters	Type	Where Typedef Declared
c	register char	Standard
ReturnValues		
Return Value	Type	Meaning
c	char	Upper case or unconverted character

**Table 2.14-110: upcase CSU [8.14.3.8.1]**

#### 2.14.3.8.2 cistrcmp CSU

This CSU performs a case independent string compare.

Parameters		
Parameters	Type	Where Typedef Declared
*a	pointer to register char	Standard
*b	pointer to register char	Standard
ReturnValues		
Return Value	Type	Meaning
1	int	Characters compare
0	int	Characters different
Calls		
Function	Where Described	
upcase	Sec. 2.14.3.8.1	

**Table 2.14-111: cistrcmp CSU [8.14.3.8.2]**

**2.14.3.8.3 cistrncmp CSU**

This CSU performs a case independent string compare of "n" characters length.

Parameters		
Parameters	Type	Where Typedef Declared
*a	pointer to register char	Standard
*b	pointer to register char	Standard
n	int	Standard
ReturnValues		
Return Value	Type	Meaning
1	int	Characters compare
0	int	Characters different
Calls		
Function	Where Described	
upcase	Sec. 2.14.3.8.1	

**Table 2.14-112: cistrncmp CSU [8.14.3.8.3]**

**2.14.3.9 libutil.h CSU**

/simnet/libsrc/libutil/libutil.h

This CSU contains the utility library macros (defined in Appendix A), constants (fractional values of PI, rectangle processing definitions, and the maximum number of polygon vertices), and two geometric structure definitions. The constants and structures are found in the following three tables.

Constant	Value
PI OVER 2 /* Fractional values of PI */	1.5707963267948965000
PI OVER 3	1.0471975511965976000
PI OVER 4	0.7853981633974482700
PI OVER 6	0.5235987755982987900
PI OVER 8	0.3926990816987241400
UPPER LEFT /* Rectangle definitions */	0x01
UPPER RIGHT	0x02
LOWER RIGHT	0x04
LOWER LEFT	0x08
MAX POLYGON VERTICES	11

**Table 2.14-113: libutil.h Constant Definitions**

Item	Type	Where Type Defined
left	REAL	sim types.h
top	REAL	sim types.h
right	REAL	sim types.h
bottom	REAL	sim types.h

**Table 2.14-114: RECT Structure Definition**

Item	Type	Where Type Defined
boundaries	RECT	The previous typedef struct
num_vertices	int	Standard
vertices[MAX_POLYGON_VERTICES][2]	REAL	sim_types.h

Table 2.14-115: POLYGON Structure Definition

#### 2.14.4 libcomm CSC

/simnet/libsrc/libcomm

This is a library of list, queue, and tree handling code. This is also where the performance monitoring code is defined.

##### 2.14.4.1 bufpool.c CSC

/simnet/libsrc/libcomm/bufpool.c

This CSC contains CSUs dealing with buffer queues. In addition, a number of macros are defined. These are described in Appendix A.

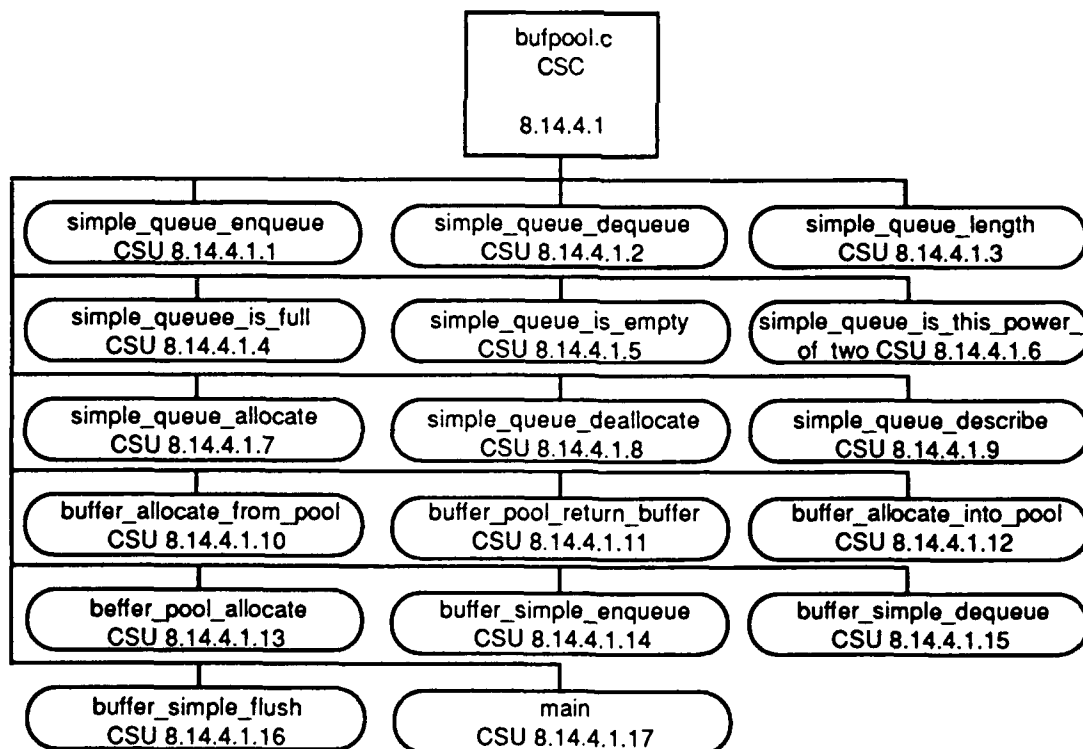


Figure 2.14-14: bufpool.c CSC Structure



**2.14.4.1.1 simple\_queue\_enqueue CSU**

This CSU enqueues an item to a buffer.

Parameters		
Parameters	Type	Where Typedef Declared
*sqp	pointer to register SIMPLE_QUEUE	Sec. 2.14.4.3
item	POINTER	sim_stype.h
ReturnValues		
Return Value	Type	Meaning
ret	int	TRUE - item enqueued FALSE - buffer full
Calls		
Function	Where Described	
SQLOCK	Sec. 2.14.4.1	
SQFULL	Sec. 2.14.4.1	
SQNO	Sec. 2.14.4.1	
SQUNLOCK	Sec. 2.14.4.1	

**Table 2.14-116: simple\_queue\_enqueue CSU [8.14.4.1.1]**

**2.14.4.1.2 simple\_queue\_dequeue CSU**

This CSU dequeues the buffer. It returns NULL if the buffer was empty and returns the contents of the buffer otherwise.

Parameters		
Parameters	Type	Where Typedef Declared
*sqp	pointer to register SIMPLE_QUEUE	Sec. 2.14.4.3
ReturnValues		
Return Value	Type	Meaning
NULL	POINTER	buffer was empty
ret	POINTER	contents of buffer
Calls		
Function	Where Described	
SQLOCK	Sec. 2.14.4.1	
SQFULL	Sec. 2.14.4.1	
SQNO	Sec. 2.14.4.1	
SQUNLOCK	Sec. 2.14.4.1	

**Table 2.14-117: simple\_queue\_dequeue CSU [8.14.4.1.2]**

**2.14.4.1.3 simple\_queue\_length CSU**

This CSU returns the size of the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
*sqp	pointer to register SIMPLE_QUEUE	Sec. 2.14.4.3
ReturnValues		
Return Value	Type	Meaning
length	int	size of buffer
Calls		
Function	Where Described	
SQLOCK	Sec. 2.14.4.1	
SQLENGTH	Sec. 2.14.4.1	
SQUNLOCK	Sec. 2.14.4.1	

**Table 2.14-118: simple\_queue\_length CSU [8.14.4.1.3]**

**2.14.4.1.4 simple\_queue\_is\_full CSU**

This CSU determines if the buffer is full.

Parameters		
Parameters	Type	Where Typedef Declared
*sqp	pointer to register SIMPLE_QUEUE	Sec. 2.14.4.3
ReturnValues		
Return Value	Type	Meaning
ret	int	queue is full
Calls		
Function	Where Described	
SQLOCK	Sec. 2.14.4.1	
SQFULL	Sec. 2.14.4.1	
SQUNLOCK	Sec. 2.14.4.1	

**Table 2.14-119: simple\_queue\_is\_full CSU [8.14.4.1.4]**

#### 2.14.4.1.5 simple\_queue\_is\_empty CSU

This CSU determines if the buffer is empty.

Parameters		
Parameters	Type	Where Typedef Declared
*sqp	pointer to SIMPLE_QUEUE	Sec. 2.14.4.3
ReturnValues		
Return Value	Type	Meaning
ret	int	buffer is empty
Calls		
Function	Where Described	
SQLOCK	Sec. 2.14.4.1	
SQEMPTY	Sec. 2.14.4.1	
SQUNLOCK	Sec. 2.14.4.1	

Table 2.14-120: simple\_queue\_is\_empty CSU [8.14.4.1.5]

#### 2.14.4.1.6 simple\_queue\_is\_this\_power\_of\_two CSU

This CSU determines if the buffer size, in bits, is equal to a power of two.

Parameters		
Parameters	Type	Where Typedef Declared
l	unsigned long	Standard
ReturnValues		
Return Value	Type	Meaning
TRUE	int	number of bits is equal to a power of two
FALSE	int	number of bits not equal to a power of two

Table 2.14-121: simple\_queue\_is\_this\_power\_of\_two CSU [8.14.4.1.6]

#### 2.14.4.1.7 simple\_queue\_allocate CSU

This CSU allocates the buffer space for the buffer of length size.

Parameters		
Parameters	Type	Where Typedef Declared
size	unsigned long	Standard
ReturnValues		
Return Value	Type	Meaning
sqp	pointer to SIMPLE_QUEUE	pointer to contents of buffer
NULL	pointer to SIMPLE_QUEUE	queue is empty

Calls	
Function	Where Described
simple_queue_is_this_power_of_two	Sec. 2.14.4.1.6
heap_allocate	Sec. 2.14.2.1.3

Table 2.14-122: simple\_queue\_allocate CSU [8.14.4.1.7]

## 2.14.4.1.8 simple\_queue\_deallocate CSU

This CSU deallocates the buffer space.

Parameters		
Parameters	Type	Where Typedef Declared
*sqp	pointer to SIMPLE_QUEUE	Sec. 2.14.4.3
Calls		
Function	Where Described	
SQLOCK	Sec. 2.14.4.1	
heap_deallocate	Sec. 2.2.14.2.1.2	

Table 2.14-123: simple\_queue\_deallocate CSU [8.14.4.1.8]

## 2.14.4.1.9 simple\_queue\_describe CSU

This CSU orints statistics about the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
*sqp	pointer to SIMPLE_QUEUE	Sec. 2.14.4.3
Calls		
Function	Where Described	
SQLENGTH	Sec. 2.14.4.1	
SQUNLOCK	Sec. 2.14.4.1	

Table 2.14-124: simple\_queue\_describe CSU [8.14.4.1.9]

## 2.14.4.1.10 buffer\_allocate\_from\_pool CSU

This CSU allocates a buffer from the pool of available buffers.

Parameters		
Parameters	Type	Where Typedef Declared
buf_pool	pointer to BUFFER_POOL	Sec. 2.14.4.3

ReturnValues		
Return Value	Type	Meaning
p	BYTE POINTER	pointer to buffer from pool
NULL	BYTE POINTER	couldn't get buffer from pool
Calls		
Function	Where Described	
simple_queue_dequeue	Sec. 2.14.4.1.2	
char_from_buffer	Sec. 2.14.4.3	

Table 2.14-125: buffer\_allocate\_from\_pool CSU [8.14.4.1.10]

## 2.14.4.1.11 buffer\_pool\_return\_buffer CSU

This CSU enqueues a pool buffer.

Parameters		
Parameters	Type	Where Typedef Declared
bp	pointer to BUFFER	Sec. 2.14.4.3
Calls		
Function	Where Described	
simple_queue_enqueue	Sec. 2.14.4.1.1	

Table 2.14-126: buffer\_pool\_return\_buffer CSU [8.14.4.1.11]

## 2.14.4.1.12 buffer\_allocate\_into\_pool CSU

This CSU allocates a buffer into the available buffer pool.

Parameters		
Parameters	Type	Where Typedef Declared
buf_pool	pointer to BUFFER_POOL	Sec. 2.14.4.3
size	int	Standard
Calls		
Function	Where Described	
buffer_allocate	Sec. 2.14.4.2.12	
char_from_buffer	Sec. 2.14.4.3	
buffer_one_less	Sec. 2.14.4.2.29	
buffer_pool_return_buffer	Sec. 2.14.4.1.11	

Table 2.14-127: buffer\_allocate\_into\_pool CSU [8.14.4.1.12]

**2.14.4.1.13      buffer\_pool\_allocate CSU**

This CSU allocates the entire buffer pool.

Parameters		
Parameters	Type	Where Typedef Declared
size	int	Standard
number	int	Standard
ReturnValues		
Return Value	Type	Meaning
bufpool	BUFFER_POOL	pointer to pool of buffers
Calls		
Function	Where Described	
simple_queue_allocate	Sec. 2.14.4.1.1	
buffer_allocate_into_pool	Sec. 2.14.4.1.12	

**Table 2.14-128:    buffer\_pool\_allocate CSU [8.14.4.1.13]**

**2.14.4.1.14      buffer\_simple\_enqueue CSU**

This CSU enqueues the buffer and increments the pointer to point to the next available location.

Parameters		
Parameters	Type	Where Typedef Declared
*sqp	pointer to SIMPLE_QUEUE	Sec. 2.14.4.3
p	BYTE_POINTER	Sec. 2.14.4.3
ReturnValues		
Return Value	Type	Meaning
successp	int	indicates success or failure
Calls		
Function	Where Described	
buffer_from_char	Sec. 2.14.4.3	
simple_queue_enqueue	Sec. 2.14.1.1	

**Table 2.14-129:    buffer\_simple\_enqueue CSU [8.14.4.1.14]**

**2.14.4.1.15      buffer\_simple\_dequeue CSU**

This CSU dequeues the buffer and returns the contents of the buffer. If the buffer was empty, it returns NULL.

Parameters		
Parameters	Type	Where Typedef Declared
*sqp	pointer to SIMPLE_QUEUE	Sec. 2.14.4.3
ReturnValues		
Return Value	Type	Meaning
p	BYTE_POINTER	contents of buffer
NULL	BYTE_POINTER	buffer empty
Calls		
Function	Where Described	
simple_queue dequeue	Sec. 2.14.4.1.1	
char from buffer	Sec. 2.14.4.3	

**Table 2.14-130:    buffer\_simple\_dequeue CSU [8.14.4.1.15]**

**2.14.4.1.16      buffer\_simple\_flush CSU**

This CSU flushes the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
*sqp	pointer to SIMPLE_QUEUE	Sec. 2.14.4.3
Calls		
Function	Where Described	
buffer simple dequeue	Sec. 2.14.4.1.16	
buffer deallocate	Sec. 2.14.4.3.15	

**Table 2.14-131:    buffer\_simple\_flush CSU [8.14.4.1.16]**

**2.14.4.1.17      main CSU**

This is the top level routine for this module. It coordinates the allocation of the buffer pool.

Calls	
Function	Where Described
buffer pool allocate	Sec. 2.14.1.13
buffer allocate from pool	Sec. 2.14.4.1.10

**Table 2.14-132:    main CSU [8.14.4.1.17]**

### 2.14.4.2 queue\_fix.c CSC

/simnet/libsrc/libcomm/queue\_fix.c

This CSC contains CSUs dealing with locked queues. In addition, there are two macros whose expansion definition are conditional on MULTIPROCESSOR being defined. These are QLOCK(qp) and QUNLOCK(qp). These macros are described in Appendix A.

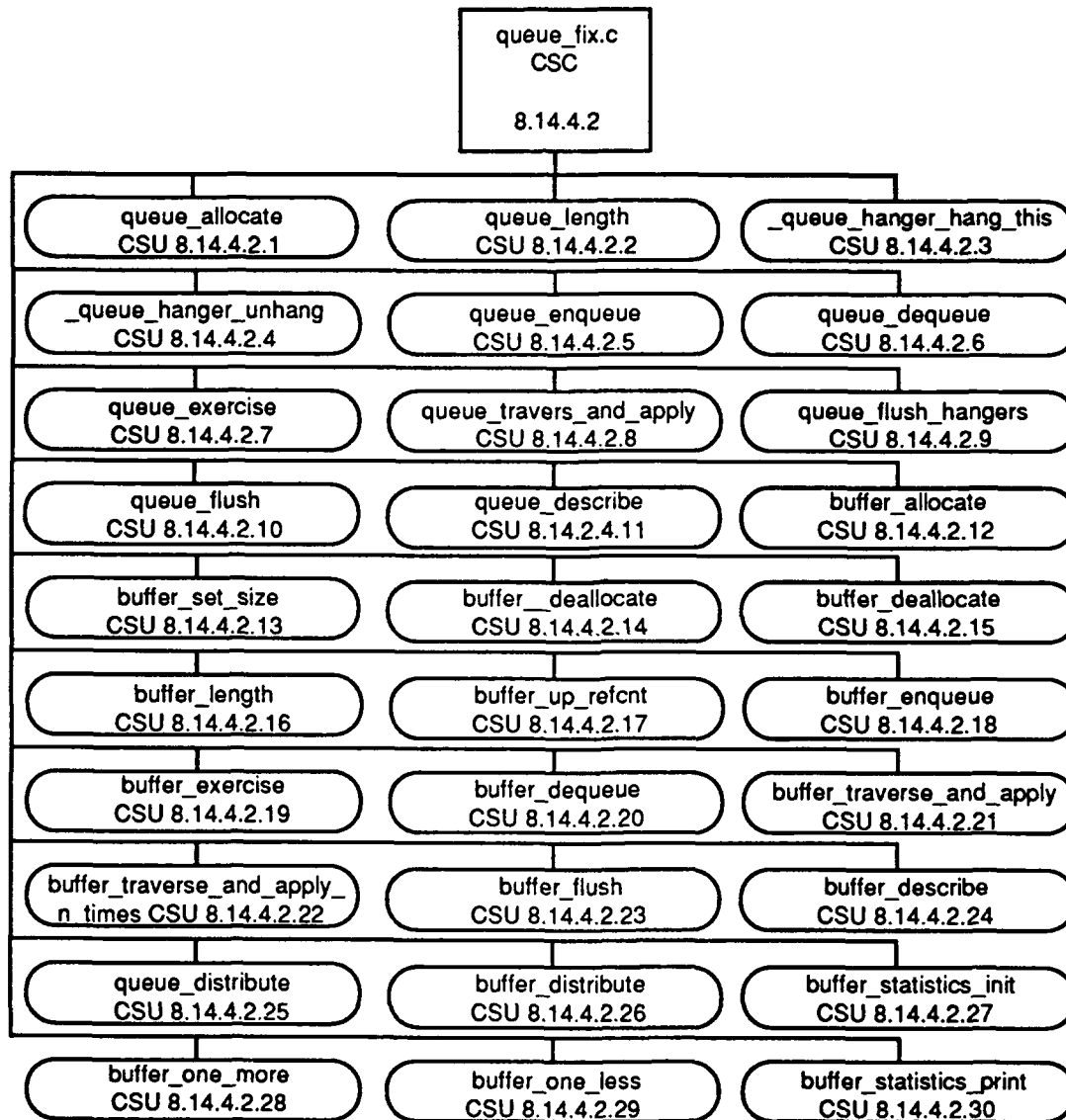


Figure 2.14-15: queue\_fix.c CSC Structure



**2.14.4.2.1 queue\_allocate CSU**

This CSU allocates the buffer.

ReturnValues		
Return Value	Type	Meaning
qp	pointer to QUEUE	
Calls		
Function	Where Described	
buffer_allocate	Sec. 2.14.4.2.12	
QUNLOCK	Sec. 2.14.4.3	
QLOCK	Sec. 2.14.4.3	

**Table 2.14-133: queue\_allocate CSU [8.14.4.2.1]**

**2.14.4.2.2 queue\_length CSU**

This CSU returns the length of the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
*qp	pointer to register QUEUE	Sec. 2.14.4.3
ReturnValues		
Return Value	Type	Meaning
ret	int	Length
Calls		
Function	Where Described	
QLOCK	Sec. 2.14.4.2 See Appendix A	
QUNLOCK	Sec. 2.14.4.2 See Appendix A	

**Table 2.14-134: queue\_length CSU [8.14.4.2.2]**

**2.14.4.2.3 \_queue\_hanger\_hang\_this CSU**

Parameters		
Parameters	Type	Where Typedef Declared
*p	pointer to BUFFER	Sec. 2.14.4.3
ReturnValues		
Return Value	Type	Meaning
h	pointer to QELEMENT	
Calls		
Function	Where Described	
heap_allocate	Sec. 2.14.2.1.1	

**Table 2.14-135: \_queue\_hanger\_hang\_this CSU [8.14.4.2.3]**

## 2.14.4.2.4 \_queue\_hanger\_unhang CSU

Parameters		
Parameters	Type	Where Typedef Declared
*p	pointer to BUFFER	Sec. 2.14.4.3
ReturnValues		
Return Value	Type	Meaning
p	pointer to BUFFER	
Calls		
Function	Where Described	
heap_deallocate	Sec. 2.14.2.1.4	

Table 2.14-136: \_queue\_hanger\_unhang CSU [8.14.4.2.4]

## 2.14.4.2.5 queue\_enqueue CSU

This CSU enqueues the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
*qp	pointer to register QUEUE	Sec. 2.14.4.3
*bufp	pointer to BUFFER	Sec. 2.14.4.3
Calls		
Function	Where Described	
QLOCK	Sec. 2.14.4.3	
QUNLOCK	Sec. 2.14.4.3	
queue_hanger hang this	Sec. 2.14.4.2.7	

Table 2.14-137: queue\_enqueue CSU [8.14.4.2.5]

## 2.14.4.2.6 queue\_dequeue CSU

This CSU dequeues the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
*qp	pointer to register QUEUE	Sec. 2.14.4.3
ReturnValues		
Return Value	Type	Meaning
ret	pointer to BUFFER	pointer to contents of buffer
Calls		
Function	Where Described	
QLOCK	Sec. 2.14.4.3	
QUNLOCK	Sec. 2.14.4.3	
queue_hanger unhang	Sec. 2.14.4.2.7	

Table 2.14-138: queue\_dequeue CSU [8.14.4.2.6]

## 2.14.4.2.7 queue\_excise CSU

Parameters		
Parameters	Type	Where Typedef Declared
*qp	pointer to register QUEUE	Sec. 2.14.4.3
*p	pointer to register BUFFER	Sec. 2.14.4.3
ReturnValues		
Return Value	Type	Meaning
ret	pointer to BUFFER	
Calls		
Function	Where Described	
queue_hanger_unhang	Sec. 2.14.4.2.4	
QUNLOCK	Sec. 2.14.4.3	

Table 2.14-139: queue\_excise CSU [8.14.4.2.7]

## 2.14.4.2.8 queue\_traverse\_and\_apply CSU

Parameters		
Parameters	Type	Where Typedef Declared
*qp	pointer to register QUEUE	Sec. 2.14.4.3
fcn	PFI	sim_types.h
arg	not defined	N/A
ReturnValues		
Return Value	Type	Meaning
count	int	1 if "hit" 0 if "miss"
Calls		
Function	Where Described	
QLOCK	Sec. 2.14.4.3	
QUNLOCK	Sec. 2.14.4.3	

Table 2.14-140: queue\_traverse\_and\_apply CSU [8.14.4.2.8]

## 2.14.4.2.9 queue\_flush\_hangers CSU

Parameters		
Parameters	Type	Where Typedef Declared
*qep	pointer to QELEMENT	Sec. 2.14.4.3
Calls		
Function	Where Described	
queue_flush_hangers	Sec. 2.14.4.2.9	
heap_deallocate	Sec. 2.14.2.1.4	

Table 2.14-141: queue\_flush\_hangers CSU [8.14.4.2.9]

**2.14.4.2.10 queue\_flush CSU**

This CSU flushes the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
*qp	pointer to register QUEUE	Sec. 2.14.4.3
deallocate_fcn	PFV	sim_types.h
arg	not defined	N/A
Calls		
Function	Where Described	
QLOCK	Sec. 2.14.4.3	
QUNLOCK	Sec. 2.14.4.3	
queue_flush_hangers	Sec. 2.14.4.2.9	

Table 2.14-142: queue\_flush CSU [8.14.4.2.10]

**2.14.4.2.11 queue\_describe CSU**

This CSU prints information about the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
*qp	pointer to QUEUE	Sec. 2.14.4.3
Calls		
Function	Where Described	
QLOCK	Sec. 2.14.4.3	
QUNLOCK	Sec. 2.14.4.3	

Table 2.14-143: queue\_describe CSU [8.14.4.2.11]

**2.14.4.2.12 buffer\_allocate CSU**

This CSU allocates the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
size	int	Standard
ReturnValues		
Return Value	Type	Meaning
(char_from_buffer(bp)	BYTE_POINTER	
Calls		
Function	Where Described	
heap_allocate	Sec. 2.14.2.1.1	
buffer_one_more	Sec. 2.14.4.2.28	
char_from_buffer	Sec. 2.14.4.3	

Table 2.14-144: queue\_describe CSU [8.14.4.2.12]

**2.14.4.2.13      buffer\_set\_size CSU**

This CSU sets the size of the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
p	BYTE POINTER	Sec. 2.14.4.3
new_size	int	Standard
Calls		
Function	Where Described	
buffer_from_char	Sec. 2.14.4.3	

**Table 2.14-145:    buffer\_set\_size CSU [8.14.4.2.13]**

**2.14.4.2.14      buffer\_\_deallocate CSU**

This CSU deallocates the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
*bp	pointer to register BUFFER	Sec. 2.14.4.3
Calls		
Function	Where Described	
buffer one less	Sec. 2.14.4.2.29	
buffer pool return buffer	Sec. 2.14.4.1.11	
heap deallocate	Sec. 2.14.2.1.4	

**Table 2.14-146:    buffer\_\_deallocate CSU [8.14.4.2.14]**

**2.14.4.2.15      buffer\_deallocate CSU**

This CSU deallocates the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
p	BYTE POINTER	Sec. 2.14.4.3
Calls		
Function	Where Described	
buffer deallocate	Sec. 2.14.4.2.15	
buffer_from_char	Sec. 2.14.4.3	

**Table 2.14-147:    buffer\_deallocate CSU [8.14.4.2.15]**

**2.14.4.2.16      buffer\_length CSU**

This CSU returns the length of the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
p	BYTE_POINTER	Sec. 2.14.4.3
ReturnValues		
Return Value	Type	Meaning
bp->length	int	length of buffer
Calls		
Function	Where Described	
buffer_from_char	Sec. 2.14.4.3	

Table 2.14-148: buffer\_length CSU [8.14.4.2.16]

**2.14.4.2.17      buffer\_up\_refcnt CSU**

Parameters		
Parameters	Type	Where Typedef Declared
p	BYTE_POINTER	Sec. 2.14.4.3
Calls		
Function	Where Described	
buffer_from_char	Sec. 2.14.4.3	

Table 2.14-149: buffer\_up\_refcnt CSU [8.14.4.2.17]

**2.14.4.2.18      buffer\_enqueue CSU**

This CSU enqueues the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
*qp	pointer to QUEUE	Sec. 2.14.4.3
p	BYTE_POINTER	Sec. 2.14.4.3
Calls		
Function	Where Described	
buffer_from_char	Sec. 2.14.4.3	
queue_enqueue	Sec. 2.14.4.2.5	

Table 2.14-150: buffer\_enqueue CSU [8.14.4.2.18]

**2.14.4.2.19      buffer\_excise CSU**

Parameters		
Parameters	Type	Where Typedef Declared
*qp	pointer to QUEUE	Sec. 2.14.4.3
p	BYTE POINTER	Sec. 2.14.4.3
ReturnValues		
Return Value	Type	Meaning
foo	BYTE POINTER	buffer excised
NULL	BYTE POINTER	buffer not excised
Calls		
Function	Where Described	
buffer from char	Sec. 2.14.4.3	
queue_excise	Sec. 2.14.4.2.7	
char from buffer	Sec. 2.14.4.3	

**Table 2.14-151:    buffer\_excise CSU [8.14.4.2.19]****2.14.4.2.20      buffer\_dequeue CSU**

This CSU dequeues the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
*qp	pointer to QUEUE	Sec. 2.14.4.3
Calls		
Function	Where Described	
queue dequeue	Sec. 2.14.4.2.6	
char from buffer	Sec. 2.14.4.3	

**Table 2.14-152:    buffer\_dequeue CSU [8.14.4.2.20]****2.14.4.2.21      buffer\_traverse\_and\_apply CSU**

Parameters		
Parameters	Type	Where Typedef Declared
*qp	pointer to register QUEUE	Sec. 2.14.4.3
fcn	PFI	sim_types.h
arg1	not defined	N/A
arg2	not defined	N/A
Calls		
Function	Where Described	
queue dequeue	Sec. 2.14.4.2.6	
char from buffer	Sec. 2.14.4.3	

**Table 2.14-153:    buffer\_traverse\_and\_apply CSU [8.14.4.2.21]**

**2.14.4.2.22      buffer\_traverse\_and\_apply\_n\_times CSU**

Parameters		
Parameters	Type	Where Typedef Declared
*qp	pointer to register QUEUE	Sec. 2.14.4.3
fcn	PFI	sim_types.h
arg	not defined	N/A
n	int	Standard
Calls		
Function	Where Described	
QLOCK	Sec. 2.14.4.3	
QUNLOCK	Sec. 2.14.4.3	
char from buffer	Sec. 2.14.4.3	

**Table 2.14-154:    buffer\_traverse\_and\_apply\_n\_times CSU [8.14.4.2.22]****2.14.4.2.23      buffer\_flush CSU**

This CSU flushes the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
*qp	pointer to QUEUE	Sec. 2.14.4.3
Calls		
Function	Where Described	
queue_flush	Sec. 2.14.4.2.10	

**Table 2.14-155:    buffer\_flush CSU [8.14.4.2.23]****2.14.4.2.24      buffer\_describe CSU**

This CSU prints information about the buffer.

Parameters		
Parameters	Type	Where Typedef Declared
p	BYTE_POINTER	Sec. 2.14.4.3
Calls		
Function	Where Described	
buffer from char	Sec. 2.14.4.3	

**Table 2.14-156:    buffer\_describe CSU [8.14.4.2.24]**



**2.14.4.2.25 queue\_distribute CSU**

Parameters		
Parameters	Type	Where Typedef Declared
*qp	pointer to QUEUE	Sec. 2.14.4.3
*bp	pointer to BUFFER	Sec. 2.14.4.3
Calls		
Function	Where Described	
queue_traverse_and_apply	Sec. 2.14.4.2.8	

Table 2.14-157: queue\_distribute CSU [8.14.4.2.25]

**2.14.4.2.26 buffer\_distribute CSU**

Parameters		
Parameters	Type	Where Typedef Declared
*qp	pointer to QUEUE	Sec. 2.14.4.3
p	BYTE POINTER	Sec. 2.14.4.3
Calls		
Function	Where Described	
buffer_traverse_and_apply	Sec. 2.14.4.2.8	

Table 2.14-158: buffer\_distribute CSU [8.14.4.2.26]

**2.14.4.2.27 buffer\_statistics\_init CSU**

Calls	
Function	Where Described
heap_allocate	Sec. 2.14.2.1.1

Table 2.14-159: buffer\_statistics\_init CSU [8.14.4.2.27]

**2.14.4.2.28 buffer\_one\_more CSU**

Calls	
Function	Where Described
buffer_statistics_init	Sec. 2.14.4.2.27

Table 2.14-160: buffer\_one\_more CSU [8.14.4.2.28]

**2.14.4.2.29 buffer\_one\_less CSU**

Calls	
Function	Where Described
buffer_statistics_init	Sec. 2.14.4.2.27

Table 2.14-161: buffer\_one\_less CSU [8.14.4.2.29]

**2.14.4.2.30      buffer\_statistics\_print CSU**

This CSU prints information about the buffer.

Calls	
Function	Where Described
buffer_statistics_init	Sec. 2.14.4.2.27

**Table 2.14-162:    buffer\_statistics\_print CSU [8.14.4.2.30]**

**2.14.4.3    libcomm.h CSU**

/simnet/libsrc/libcomm/libcomm.h

This CSU contains constant definitions, macro definitions, and type definitions related to queues and functions. The macros are described in Appendix A.

The constant and structure definitions are contained in the following tables.

Constant	Value
BUFFER_LENGTH	1024

**Table 2.14-163:    BUFFER\_LENGTH Constant Definition**

The following typedef struct is a fixed-length queue whose length depends on whether MULTIPROCESSOR is defined at compilation time. If it is, the lock item is added, as shown in the following table. The SIMPLE\_QUEUE structure is used to build buffer pools; BUFFER\_POOL is defined as SIMPLE\_QUEUE.

Item	Type	Where Type Defined
#ifdef MULTIPROCESSOR		
lock	LOCK_TYPE	
#endif		
queue_length_mask	unsigned long	Standard
dequeue_this	unsigned long	Standard
enqueue_here	unsigned long	Standard
*queue	pointer to POINTER	sim_style.h

**Table 2.14-164:    SIMPLE\_QUEUE Structure Definition**

Item	Type	Where Type Defined
*free_pool	pointer to BUFFER_POOL	The previous typedef struct
refcnt	int	Standard
length	int	Standard

**Table 2.14-165:    BUFFER Structure Definition**

The following typedef struct is tagged qelem.

Item	Type	Where Type Defined
*prev	pointer to qelem	This typedef struct
*next	pointer to qelem	This typedef struct
*data	pointer to BUFFER	The previous typedef struct

**Table 2.14-166: QELEMENT Structure Definition**

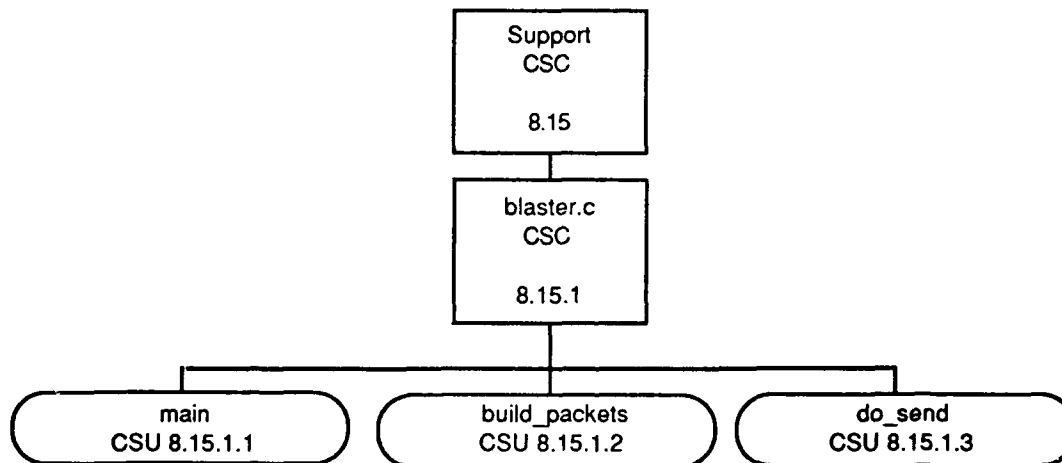
The following typedef struct is tagged queue. The structure's length depends on whether MULTIPROCESSOR is defined at compilation time. If it is, the lock item is added, as shown in the following table.

Item	Type	Where Type Defined
#ifdef MULTIPROCESSOR		
lock	LOCK_TYPE	
#endif		
*first	pointer to QELEMENT	The previous typedef struct
*last	pointer to QELEMENT	The previous typedef struct
length	int	Standard

**Table 2.14-167: QUEUE Structure Definition**

## 2.15 SUPPORT CSC

This CSC contains the CSUs used to test the SAF Simhost CSCI.



**Figure 2.15-1: Support CSC Structure**

### 2.15.1 blaster.c CSC

/simment/src/host/blaster.c

This CSC generates a program which creates multiple vehicles in locations scattered around the database. It is used to test load handling on other simhosts.

### 2.15.1.1 main CSU

This CSU is the base function for generating vehicles to test load handling.

Parameters		
Parameters	Type	Where Typedef Declared
argc	int	Standard
*argv[ ]	pointer to char	Standard
Internal Variables		
Parameters	Type	Where Typedef Declared
net_handle	int	Standard
errbuf[80]	char	Standard
Calls		
Function	Where Described	
net_open	Sec. 2.20.2.10.1 MCC CSCI SDD	
tdb_init_cache	Sec. 2.21.7.27.1 MCC CSCI SDD	
tdb_init_patch_guards	Sec. 2.21.7.10.4 MCC CSCI SDD	
build_packets	Sec. 2.15.1.2	
do_send	Sec. 2.15.1.3	
net_close	Sec. 2.20.2.3.1 MCC CSCI SDD	

Table 2.15-1: main CSU [8.15.1.1]

### 2.15.1.2 build\_packets CSU

This CSU generates an Association PDU, a Simulation PDU and a Vehicle Appearance Variant for a list of vehicles.

Calls	
Function	Where Described
PRO_SIM_APPEARANCE_SIZE	p_size.h
tdb_place_vehicle	libtdb
rmat_to_fmat	Sec. 2.14.3.5.15

Table 2.15-2: build\_packet CSU [8.15.1.2]

### 2.15.1.3 do\_send CSU

This CSU sends the Association and Simulation PDUs for a list of vehicles.

Parameters		
Parameters	Type	Where Typedef Declared
net_handler	int	Standard
Calls		
Function	Where Described	
get_millisecond_time	Sec. 2.14.3.3.2	
net_send	Sec. 2.20.2.15.1 MCC CSCI SDD	
PRO ASSOC DATAGRAM SIZE	p_size.h	

Table 2.15-3: do\_send CSU [8.15.1.3]

## APPENDIX A

This appendix contains a list of defines, in alphabetical order (upper followed by lower case characters), along with their values and locations. Note that defines that equate directly to fixed values are not included.

<b>Define</b>	ADD_STRING(s,p,b)
<b>Expansion</b>	{ if (p>b) {sprintf(p," "); p+=2;} sprintf(p,s); p+=strlen(p) }
<b>Location</b>	/simnet/src/host/saf_vehicle.c Sec. 2.6.1.1.10

<b>Define</b>	ALLOCATOR /* conditional on ALLOCATOR not being defined */
<b>Expansion</b>	malloc
<b>Location</b>	/simnet/libsrc/libreader/libreader.h Sec. 2.1.1.5

<b>Define</b>	BEGIN_ARG_TABLE(name)
<b>Expansion</b>	int name[ ][3] = {
<b>Location</b>	/simnet/libsrc/libcomm/libcomm.h Sec. 2.14.4.3

<b>Define</b>	C1(t0)
<b>Expansion</b>	f(a)].arg.t0)
<b>Location</b>	/simnet/libsrc/libsched/invoke.c Sec. 2.2.1.2

<b>Define</b>	C2(t0, t1)
<b>Expansion</b>	f(a[0].arg.t0,a[1].arg.t1)
<b>Location</b>	/simnet/libsrc/libsched/invoke.c Sec. 2.2.1.2

<b>Define</b>	C3(t0, t1, t2)
<b>Expansion</b>	f(a[0].arg.t0,a[1].arg.t1,a[2].arg.t2)
<b>Location</b>	/simnet/libsrc/libsched/invoke.c Sec. 2.2.1.2

<b>Define</b>	C4(t0, t1, t2, t3)
<b>Expansion</b>	f(a[0].arg.t0,a[1].arg.t1,a[2].arg.t2,a[3].arg.t3)
<b>Location</b>	/simnet/libsrc/libsched/invoke.c Sec. 2.2.1.2

<b>Define</b>	CALL(f)
<b>Expansion</b>	{P_CALL, ((char *)f), NULL}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	CALL1(f,a)
<b>Expansion</b>	{P_CALL, ((char *)f), ((char *)a)}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	CDR(list)
<b>Expansion</b>	((list == NULL_PTR) ? NULL_PTR : (list->cdr))
<b>Location</b>	/simnet/libsrc/libquad/libquad.h Sec. 2.12.1.18

<b>Define</b>	CDDR(list)
<b>Expansion</b>	((list == NULL_PTR)    (list->cdr == NULL_PTR)) ? NULL_PTR : ((list->cdr)->cdr)
<b>Location</b>	/simnet/libsrc/libquad/libquad.h Sec. 2.12.1.18

<b>Define</b>	CITY_BLOCKDISTANCE2(a,b)
<b>Expansion</b>	(abs(*(a) - *(b)0 + abs((a)[1] - (b)[1]))
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	CITY_BLOCKDISTANCE3(a,b)
<b>Expansion</b>	(abs(*(a) - *(b)0 + abs((a)[1] - (b)[1]) + abs((a) - (b)[2]))
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	COMMAND_DONE
<b>Expansion</b>	{P_PARSE_FUNCTION, (char *)ParseCommandDone, NULL}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	CONSTANT(a, b, c)
<b>Expansion</b>	{{(int)a, ((char *)b), ((char *)c)}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	CONSTANT_TABLE(t)
<b>Expansion</b>	PARSE_TABLE t[] = {
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	CONVERT FROM SIXTEENTH_TIME(time)
<b>Expansion</b>	(time) >> 4
<b>Location</b>	/simnet/libsrc/libutil/time.c Sec. 2.14.3.3

<b>Define</b>	DEALLOCATE /* conditional on ALLOCATOR not being defined */
<b>Expansion</b>	free
<b>Location</b>	/simnet/libsrc/libreader/libreader.h Sec. 2.1.1.5

<b>Define</b>	DEBUG(args)
<b>Expansion</b>	{if (ge_debug_flags & D_GLOBAL) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG_AIR(args)
<b>Expansion</b>	{if (ge_debug_flags & D_AIR) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG_CM(args)
<b>Expansion</b>	{if (ge_debug_flags & D_CM) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG_COLLISION(args)
<b>Expansion</b>	{if (ge_debug_flags & D_COLLISION) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG_COMPOSITE(args)
<b>Expansion</b>	{if (ge_debug_flags & D_COMPOSITE) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG CONNECTION(x)
<b>Expansion</b>	{ if (g debug flags & (g debug flags & D CONNECTION) printf x; }
<b>Location</b>	/simnet/libsrc/libudp/udp_conn.h Sec. 2.4.2.4

<b>Define</b>	DEBUG DRIVER(args)
<b>Expansion</b>	{if (ge debug flags & D DRIVER) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG EVENT(args)
<b>Expansion</b>	{if (ge debug flags & D EVENT) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG GROUND(args)
<b>Expansion</b>	{if (ge debug flags & D GROUND) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG GUNNER(args)
<b>Expansion</b>	{if (ge debug flags & D GUNNER) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG INTERVIS(args)
<b>Expansion</b>	{if (ge debug flags & D INTERVIS) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG LOADER(args)
<b>Expansion</b>	{if (ge debug flags & D LOADER) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG MISSILE(args)
<b>Expansion</b>	{if (ge debug flags & D MISSILE) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG NAVIGATOR(args)
<b>Expansion</b>	{if (ge debug flags & D NAVIGATOR) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG OBSTACLE(args)
<b>Expansion</b>	{if (ge debug flags & D OBSTACLE) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG PILOT(args)
<b>Expansion</b>	{if (ge debug flags & D PILOT) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG REMOTE(args)
<b>Expansion</b>	{if (ge debug flags & D REMOTE) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2



<b>Define</b>	DEBUG REPORTER(args)
<b>Expansion</b>	{if (ge debug flags & D REPORTER) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG STATION(args)
<b>Expansion</b>	{if (ge debug flags & D STATION) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG TACTICAL(args)
<b>Expansion</b>	{if (ge debug flags & D TACTICAL) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG TARGETING(args)
<b>Expansion</b>	{if (ge debug flags & D TARGETING) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG TURRET(args)
<b>Expansion</b>	{if (ge debug flags & D TURRET) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG VEHICLE(args)
<b>Expansion</b>	{if (ge debug flags & D VEHICLE) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DEBUG WEAPON(args)
<b>Expansion</b>	{if (ge debug flags & D WEAPON) printf args;}
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	DECLARE FOR VEHICLES DO VARS
<b>Expansion</b>	<pre> short fwnegd_i, fwnegd_j; int fwnegd_x; int fwnegd_y; int fwnegd_xg, fwnegd_yg, fwnegd_w, fwnegd_h; short low_fwnegd_xoff, high_fwnegd_xoff; short low_fwnegd_yoff, high_fwnegd_yoff; GRID_ENTRY **fwnegd_gt; GRID_ENTRY *fwnegd_ge; short fwnegd_n; struct saf_object *s </pre>
<b>Location</b>	/simnet/src/host/iterator.h Sec. 2.9.3.2

<b>Define</b>	DEFINE TABLE(t)
<b>Expansion</b>	PARSE TABLE t[] = {
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	DIST(A, B, C, D) /* Signed distance from (A,B) to (C,D) */
<b>Expansion</b>	(use x ? (x_pos ? (C) - (A) : (A) - (C)) : (y_pos ? (D) - (B) : (B) - (D)))
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	DIV_GLOC(x) /* coarsens coord. to an int in {0, 1, ..., PV_GRID_NUM} */
<b>Expansion</b>	((int)(x + EPS)) / PV_GRID_SIDE
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	DO_KEYWORD_TABLE(t)
<b>Expansion</b>	{P_PARSE_FUNCTION, (char *)ParseDoKeywordTable, ((char *)t)}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	DT
<b>Expansion</b>	safobj->tickable->time since last tick
<b>Location</b>	/simnet/src/host/flyingveh.h Sec. 2.6.4.7

<b>Define</b>	END_ARG_TABLE
<b>Expansion</b>	{0,0,0};
<b>Location</b>	/simnet/libsrc/libcomm/libcomm.h Sec. 2.14.4.3

<b>Define</b>	END_CONSTANT_TABLE
<b>Expansion</b>	{0, NULL, NULL} }
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	END_DEFINE_TABLE
<b>Expansion</b>	{0, NULL, NULL} }
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	END_FIELD_TABLE
<b>Expansion</b>	{0, NULL, NULL} }
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	END_KEYWORD
<b>Expansion</b>	{P_END_KEYWORD, NULL, NULL}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	END_KEYWORD_SELECT
<b>Expansion</b>	{P_END_KEYWORD_SELECT, NULL, NULL}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	ENERGY(mass,speed)
<b>Expansion</b>	(0.5 * mass * speed * speed)
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	ERROR_ABBORT
<b>Expansion</b>	if (g_abort_on_error) abort()
<b>Location</b>	/simnet/src/host/flyingveh.h Sec. 2.6.4.7

<b>Define</b>	ERROR_OUT(args)
<b>Expansion</b>	printf args
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	EVEN P(x)
<b>Expansion</b>	!(x & 1)
<b>Location</b>	/simnet/libsrc/libquad/libquad.h Sec. 2.12.1.18

<b>Define</b>	FARTHER2(a,b,k)
<b>Expansion</b>	$(((*a) - *(b)) * (*a) - *(b)) + ((a[1] - (b[1])) * ((a[1] - (b[1])) > (k) * (k)))$
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	FARTHER3(a,b,k)
<b>Expansion</b>	$(((*a) - *(b)) * (*a) - *(b)) + ((a[1] - (b[1])) * ((a[1] - (b[1])) + ((a[2] - (b[2])) * ((a[2] - (b[2])) > (k) * (k)))$
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	FIELD(a, b, c)
<b>Expansion</b>	$((int)a, ((char *)b), ((char *)c))$
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	FIELD TABLE(t)
<b>Expansion</b>	PARSE TABLE t[] = {
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	FIRST(list)
<b>Expansion</b>	$((list == NULL\_PTR) ? NULL\_PTR : (list->car))$
<b>Location</b>	/simnet/libsrc/libquad/libquad.h Sec. 2.12.1.18

<b>Define</b>	FOR_VEHICLES DO(match_type, form)
<b>Expansion</b>	<pre> {     unsigned short id;     struct saf_object **sp;     struct saf_object *s;      for (id=0, sp=g_safobj_table; id&lt;MAX_VEH; id++, sp++)     {         if (*sp &amp;&amp; type_ok((*sp)-&gt;saf_type, match_type))         {             s = *sp;             form;         }     } } </pre>
<b>Location</b>	/simnet/src/host/iterator.h Sec. 2.9.3.2

<b>Define</b>	FOR VEHICLES WITHIN N GRIDS DO(n,posx,posy,table,match_type,form)
<b>Expansion</b>	<pre> {     fwngd_x=posx;     fwngd_y=posy;     fwngd_xn=n;      if (coords_within_database(fwngd_x , fwngd_y))     {         fwngd_gt = grid_tables[table];         fwngd_xg = fwngd_x/grid_table_size[table];         fwngd_yg = fwngd_y/grid_table_size[table];         fwngd_w = grid_table_widths[table];         fwngd_h = grid_table_heights[table];         low_fwngd_xoff = max(-fwngd_xg, -fwngd_n);         high_fwngd_xoff = (fwngd_w-fwngd_xg,fwngd_n);         low_fwngd_yoff = max(-fwngd_yg, -fwngd_n);         high_fwngd_yoff = min(fwngd_h-fwngd_yg,fwngd_n);         for (fwngd_i=low_fwngd_xoff;             fwngd_i&lt;=high_fwngd_xoff,fwngd_i++)         {             for (fwngd_j=low_fwngd_yoff;                 fwngd_j&lt;=high_fwngd_yoff,fwngd_j++)             {                 for (fwngd_ge=fwngd_gt[(fwngd_xg+fwngd_i)+                     fwngd_w*(fwngd_yg+fwngd_j)];                     fwngd_ge,fwngd_ge=fwngd_ge-&gt;next)                 {                     s = fwngd_ge-&gt;vehicle;                     if (s &amp;&amp; type_ok(s-&gt;saf_type,match_type))                     {                         form;                     }                 }             }         }     } } </pre>
<b>Location</b>	/simnet/src/host/iterator.h Sec. 2.9.3.2

<b>Define</b>	FORCE OUT(args)
<b>Expansion</b>	{ printf args; fflush(stdout); }
<b>Location</b>	/simnet/src/host/debug.h Sec. 2.5.2.2

<b>Define</b>	GETCONSTANT(t)
<b>Expansion</b>	{P_PARSE_FUNCTION, (char *)ParseGetConstant, ((char *)t)}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	GETDECIMAL(a)
<b>Expansion</b>	{P_PARSE_FUNCTION, (char *)ParseGetdecimal, ((char *)a)}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	GETFIELDS(t)
<b>Expansion</b>	{P_PARSE_FUNCTION, (char *)ParseGrFields, ((char *)t)}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	GETHEX(a)
<b>Expansion</b>	{P_PARSE_FUNCTION, (char *)ParseGetHex, ((char *)a)}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	GETOCTAL(a)
<b>Expansion</b>	{P_PARSE_FUNCTION, (char *)ParseGetOctal, ((char *)a)}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	GETSTRING(a)
<b>Expansion</b>	{P_PARSE_FUNCTION, (char *)ParseGetString, ((char *)a)}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	GET ON OR OFF
<b>Expansion</b>	{P_PARSE_FUNCTION, (char *)ParseDoKeywordTable, ((char *)g_ParseOnOff)}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	GET YES OR NO
<b>Expansion</b>	{P_PARSE_FUNCTION, (char *)ParseDoKeywordTable, ((char *)g_ParseYesNo)}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	I32MAX(x, y)
<b>Expansion</b>	(INT32) ((x > y) ? x : y)
<b>Location</b>	/simnet/libsrc/libquad/libquad.h Sec. 2.12.1.18

<b>Define</b>	I32MIN(x, y)
<b>Expansion</b>	(INT32) ((x < y) ? x : y)
<b>Location</b>	/simnet/libsrc/libquad/libquad.h Sec. 2.12.1.18

<b>Define</b>	INSIDE_BOX2(point, tolerance)
<b>Expansion</b>	((abs(point[X]) <= tolerance) && (abs(point[Y]) <= tolerance))
<b>Location</b>	/simnet/src/host/flyingveh.h Sec. 2.6.4.7

<b>Define</b>	IS ARTY(x)
<b>Expansion</b>	((((x & (objectDomainMask   vehicleEnvironmentMask   vehicleFunctionMask)) == (objectDomainVehicle   vehicleEnvironmentGround   vehicleFunctionHowitzer))    ((x & (objectDomainMask   vehicleEnvironmentMask   vehicleFunctionMask)) == (objectDomainVehicle   vehicleEnvironmentGround   vehicleFunctionMortar)))
<b>Location</b>	/simnet/src/host/reporter.c Sec. 2.8.2.1

<b>Define</b>	IS_PC(x)
<b>Expansion</b>	((x & (objectDomainMask   vehicleEnvironmentMask   vehicleFunctionMask)) == (objectDomainVehicle   vehicleEnvironmentGround   vehicleFunctionPersonnelCarrier))
<b>Location</b>	/simnet/src/host/reporter.c Sec. 2.8.2.1

<b>Define</b>	IS_RESUPPLYING(a)
<b>Expansion</b>	((a->logistics->supplier_id)
<b>Location</b>	/simnet/src/host/logistics.h Sec. 2.6.6.2

<b>Define</b>	IS_TRUCK(x)
<b>Expansion</b>	((x & (objectDomainMask   vehicleEnvironmentMask   vehicleFunctionMask)) == (objectDomainVehicle   vehicleEnvironmentGround   vehicleFunctionSupplyTruck))
<b>Location</b>	/simnet/src/host/reporter.c Sec. 2.8.2.1

<b>Define</b>	KEYWORD(f, c)
<b>Expansion</b>	{P_KEYWORD, ((char *)f), ((char *)c)}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	KEYWORD_SELECT(a)
<b>Expansion</b>	{P_KEYWORD_SELECT, NULL, ((char *)a)}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	LOOKUP_APPEARANCE(id)
<b>Expansion</b>	(OBJ_APPEARANCE(LOOKUP_SAFOBJ(id)))
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	LOOKUP_DIRECTION(id)
<b>Expansion</b>	(OBJ_DIRECTION(LOOKUP_SAFOBJ(id)))
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	LOOKUP_FORCEID(id)
<b>Expansion</b>	(OBJ_FORCEID(LOOKUP_SAFOBJ(id)))
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	LOOKUP_GUISES(id)
<b>Expansion</b>	(OBJ_GUISES(LOOKUP_SAFOBJ(id)))
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	LOOKUP_GUNELEVATION(id)
<b>Expansion</b>	(OBJ_GUNELEVATIONLOOKUP_SAFOBJ(id)))
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	LOOKUP_HULL_TO_WORLD(id)
<b>Expansion</b>	(OBJ_HULL_TO_WORLD(LOOKUP_SAFOBJ(id)))
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	LOOKUP OBJECT TYPE(id)
<b>Expansion</b>	(OBJ OBJECT TYPE(LOOKUP SAFOBJ(id)))
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	LOOKUP OWNER PORT NUMBER(id)
<b>Expansion</b>	(OBJ OWNER PORT NUMBER(LOOKUP SAFOBJ(id)))
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	LOOKUP POSITION(id)
<b>Expansion</b>	(OBJ POSITON(LOOKUP SAFOBJ(id)))
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	LOOKUP SAFOBJ(id)
<b>Expansion</b>	(g safobj table[(id)])
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	LOOKUP SIMPLE RCVQ(id)
<b>Expansion</b>	(OBJ SIMPLE RCVQ(LOOKUP SAFOBJ(id)))
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	LOOKUP TIME SINCE LAST TICK(id)
<b>Expansion</b>	(OBJ TIME SINCE LAST TICK(LOOKUP SAFOBJ(id)))
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	LOOKUP TURRETAZIMUTH(id)
<b>Expansion</b>	(OBJ TURRETAZIMUTH(LOOKUP SAFOBJ(id)))
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	LOOKUP VEHICLE(id,type)
<b>Expansion</b>	((g_safobj_table[(id)] ? (type_ok(g_safobj_table[(id)]->saf_type, (type)) ? (g_safobj_table[(id)] : 0) : 0)
<b>Location</b>	/simnet/src/host/iterator.h Sec. 2.9.3.2

<b>Define</b>	LOOKUP VEHICLECLASS(id)
<b>Expansion</b>	(OBJ VEHICLECLASS(LOOKUP SAFOBJ(id)))
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	LOOKUP VEHICLESTATUS(id)
<b>Expansion</b>	(OBJ VEHICLESTATUS(LOOKUP SAFOBJ(id)))
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	LOOKUP VELOCITY(id)
<b>Expansion</b>	(OBJ VELOCITY(LOOKUP SAFOBJ(id)))
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	MAX(x, y)
<b>Expansion</b>	(x > y) ? x : y
<b>Location</b>	/simnet/libsrc/libquad/libquad.h Sec. 2.12.1.18

<b>Define</b>	MIN(x, y)
<b>Expansion</b>	(x < y) ? x : y
<b>Location</b>	/simnet/libsrc/libquad/libquad.h Sec. 2.12.1.18

<b>Define</b>	MOD QUEUE SIZE(sq, n)
<b>Expansion</b>	((n) & (sq)->queue length mask)
<b>Location</b>	/simnet/libsrc/libcomm/bufpool.c Sec. 2.14.4.1

<b>Define</b>	MOMENTUM(mass, speed)
<b>Expansion</b>	(mass*speed)
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	NEXT_BLOCK(block)
<b>Expansion</b>	((BLOCK_HEADER*)((char*)block) + block->size + sizeof(BLOCK_HEADER)))
<b>Location</b>	/simnet/libsrc/libheap/libheap.h Sec. 2.14.2.3

<b>Define</b>	OBJ APPEARANCE(ptr)
<b>Expansion</b>	((ptr)->entity->appearance)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	OBJ DIRECTION(ptr)
<b>Expansion</b>	((ptr)->entity->direction)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	OBJ FORCEID(ptr)
<b>Expansion</b>	((ptr)->entity->forceID)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	OBJ GUISES(ptr)
<b>Expansion</b>	((ptr)->vehicle->guises)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	OBJ GUNELEVATION(ptr)
<b>Expansion</b>	((ptr)->vehicle->gunElevation)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	OBJ HULL TO WORLD(ptr)
<b>Expansion</b>	((ptr)->vehicle->hull to world)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	OBJ OBJECT TYPE(ptr)
<b>Expansion</b>	((ptr)->vehicle->object type)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	OBJ OWNER PORT NUMBER(ptr)
<b>Expansion</b>	((ptr)->entity->owner port number)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1



<b>Define</b>	OBJ POSITION(ptr)
<b>Expansion</b>	((ptr)->entity->position)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	OBJ SIMPLE RCVC(ptr)
<b>Expansion</b>	((ptr)->entity->simple rcvc)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	OBJ TIME SINCE LAST TICK(ptr)
<b>Expansion</b>	((ptr)->tickable->time since last tick)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	OBJ TURRETAZIMUTH(ptr)
<b>Expansion</b>	((ptr)->vehicle->turretAzimuth)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	OBJ VEHICLECLASS(ptr)
<b>Expansion</b>	((ptr)->vehicle->vehicleClass)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	OBJ VEHICLEID(ptr)
<b>Expansion</b>	((ptr)->entity->vehicleID)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	OBJ VEHICLESTATUS(ptr)
<b>Expansion</b>	((ptr)->vehicle->vehicleStatus)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	OBJ VELOCITY(ptr)
<b>Expansion</b>	((ptr)->entity->velocity)
<b>Location</b>	/simnet/src/host/safobj.h Sec. 2.9.1.1

<b>Define</b>	ODD P(x)
<b>Expansion</b>	(x & 1)
<b>Location</b>	/simnet/libsrc/libquad/libquad.h Sec. 2.12.1.18

<b>Define</b>	OPTIONAL
<b>Expansion</b>	{P_PARSE_FUNCTION, (char *)ParseOptional, NULL}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	ORDER FROM USER
<b>Expansion</b>	((SAF_OBJECT *)NULL)
<b>Location</b>	/simnet/src/host/sbx.c Sec. 2.4.3.2

<b>Define</b>	PARSE_FUNCTION(f, a)
<b>Expansion</b>	{P_PARSE_FUNCTION, ((char *)f), ((char *)a)}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	PARSE_KEYWORDS(t)
<b>Expansion</b>	{P_PARSE_KEYWORDS, ((char *)t), NULL}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	PATCH_COORD(x) /* Shift coordinates with (0,0) at lower left corner of patch */
<b>Expansion</b>	((x) - PATCH_ROUND_DOWN)
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	PATCH_ROUND_DOWN(x)
<b>Expansion</b>	(patch_size * (((int)(x)) / patch_size))
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	PATCH_ROUND_UP(x)
<b>Expansion</b>	(patch_size * (1 + (((int)(x)) / patch_size)))
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	POKE(d, a)
<b>Expansion</b>	PUTARG(sizeof (*a)) PUTARG(d) PUTARG(a) CALL(ParPoke)
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	POKE_B(d, a)
<b>Expansion</b>	PUTARG(1) PUTARG(d) PUTARG(a) CALL(ParPoke)
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	POKE_L(d, a)
<b>Expansion</b>	PUTARG(4) PUTARG(d) PUTARG(a) CALL(ParPoke)
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	POKE_W(d, a)
<b>Expansion</b>	PUTARG(2) PUTARG(d) PUTARG(a) CALL(ParPoke)
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	POINT_TO_LINE(x, y, m, b) /* gives "y" distance from point (x,y) to line */
<b>Expansion</b>	((y) - (m)*(x) - (b))
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	POSITION
<b>Expansion</b>	safobj->entity->position
<b>Location</b>	/simnet/src/host/flyingveh.h Sec. 2.6.4.7

<b>Define</b>	PRINT(s)
<b>Expansion</b>	{P_PRINT, ((char *)s), NULL}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	PRINT1(s, a)
<b>Expansion</b>	{P_PRINT, ((char *)s), ((char *)a)}
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	PRINTFIELDS(f, b)
<b>Expansion</b>	P PRINTFIELD, ((char *)f), ((char *)b)
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	PUTARG(v)
<b>Expansion</b>	P_PARSE_FUNCTION, (char *)ParsePutArg, ((char *)v)
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	PV_GLOC_BIT(x,y)
<b>Expansion</b>	(DIV_GLOC(x) + DIV_GLOC(y)) * PV_GRID_NUM
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	PV_GLOC_BIT2(x,y)
<b>Expansion</b>	((x) + (y)) * PV_GRID_NUM
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	PV_REF_GR_NUM /* no. of refined grid squares per side */
<b>Expansion</b>	(PV_GRID_NUM * REFINEMENT_LEVEL)
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	PV_REF_GR_SIDE /* side length of one refined grid square */
<b>Expansion</b>	((float)patch_size / PV_REF_GR_NUM)
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	QLOCK(sqp) /* only if MULTIPROCESSOR defined, otherwise ";" */
<b>Expansion</b>	lock_wait(&(qp->lock))
<b>Location</b>	/simnet/libsrc/libcomm/queue_fix.c Sec. 2.14.4.2

<b>Define</b>	QUNLOCK(sqp) /* only if MULTIPROCESSOR defined, otherwise ";" */
<b>Expansion</b>	lock_unlock(&(qp->lock))
<b>Location</b>	/simnet/libsrc/libcomm/queue_fix.c Sec. 2.14.4.2

<b>Define</b>	RANGE_CLIP(a,x,b)
<b>Expansion</b>	((x) < (a)) ? (a) : (((x) > (b)) ? (b) : (x))
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	RETYPE_VEHICLE(id,type)
<b>Expansion</b>	(g_safobj_table[id]->saf_type = (type))
<b>Location</b>	/simnet/src/host/iterator.h Sec. 2.9.3.2

<b>Define</b>	S(n, x, y)
<b>Expansion</b>	switch (a[0].tag) <div style="margin-left: 20px;">             {             case A_INT: x ; break ;             case A_DOUBLE: y ; break ;             }             break         </div>
<b>Location</b>	/simnet/libsrc/libsched/invoke.c Sec. 2.2.1.2

<b>Define</b>	SAF_COMPOSITE P(safobj)
<b>Expansion</b>	(type ok(safobj->saf_type, COMPOSITE))
<b>Location</b>	/simnet/src/host/iterator.h Sec. 2.9.3.2

<b>Define</b>	SAF_INACTIVE_REMOTE_VEHICLE P(safobj)
<b>Expansion</b>	(type ok(safobj->saf_type, INACTIVE_REMOTE_VEHICLE))
<b>Location</b>	/simnet/src/host/iterator.h Sec. 2.9.3.2

<b>Define</b>	SAF_LOCAL P(safobj)
<b>Expansion</b>	(type ok(safobj->saf_type, LOCALS))
<b>Location</b>	/simnet/src/host/iterator.h Sec. 2.9.3.2

<b>Define</b>	SAF_LOCAL_VEHICLE P(safobj)
<b>Expansion</b>	(type ok(safobj->saf_type, LOCAL_VEHICLE))
<b>Location</b>	/simnet/src/host/iterator.h Sec. 2.9.3.2

<b>Define</b>	SAF_MISSILE P(safobj)
<b>Expansion</b>	(type ok(safobj->saf_type, MOSSILE))
<b>Location</b>	/simnet/src/host/iterator.h Sec. 2.9.3.2

<b>Define</b>	SAF_REMOTE_VEHICLE P(safobj)
<b>Expansion</b>	(type ok(safobj->saf_type, REMOTE_VEHICLE))
<b>Location</b>	/simnet/src/host/iterator.h Sec. 2.9.3.2

<b>Define</b>	SAF_VEHICLE P(safobj)
<b>Expansion</b>	(type ok(safobj->saf_type, VEHICLE))
<b>Location</b>	/simnet/src/host/iterator.h Sec. 2.9.3.2

<b>Define</b>	SCALE_COORDS(x)
<b>Expansion</b>	((int)((x) / pv_ref_gr_size))
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	SECOND(list)
<b>Expansion</b>	((list == NULL_PTR)    (list->cdr == NULL_PTR)) ? NULL_PTR : ((list->cdr)->car)
<b>Location</b>	/simnet/libsrc/libquad/libquad.h Sec. 2.12.1.18

<b>Define</b>	SQDQ(sqp)
<b>Expansion</b>	MOD_QUEUE_SIZE(sqp, (sqp->dequeue_this))
<b>Location</b>	/simnet/libsrc/libcomm/bufpool.c Sec. 2.14.4.1

<b>Define</b>	SQEMPTY(sqp)
<b>Expansion</b>	(SLENGTH(sqp) IS 0)
<b>Location</b>	/simnet/libsrc/libcomm/bufpool.c Sec. 2.14.4.1

<b>Define</b>	SQFULL(sqp)
<b>Expansion</b>	(SLENGTH(sqp) IS (sqp->queue_length_mask + 1))
<b>Location</b>	/simnet/libsrc/libcomm/bufpool.c Sec. 2.14.4.1

<b>Define</b>	SQLENGTH(sq)
<b>Expansion</b>	(sq->enqueue here - sq->deque this)
<b>Location</b>	/simnet/libsrc/libcomm/bufpool.c Sec. 2.14.4.1

<b>Define</b>	SLOCK(sq) /* only if MULTIPROCESSOR defined, otherwise ";" */
<b>Expansion</b>	lock_wait(&(sq->lock))
<b>Location</b>	/simnet/libsrc/libcomm/bufpool.c Sec. 2.14.4.1

<b>Define</b>	SQSQ(sq)
<b>Expansion</b>	MOD QUEUE_SIZE(sq,(sq->enqueue here)
<b>Location</b>	/simnet/libsrc/libcomm/bufpool.c Sec. 2.14.4.1

<b>Define</b>	SQUNLOCK(sq) /* only if MULTIPROCESSOR defined, otherwise ";" */
<b>Expansion</b>	lock_unlock(&(sq->lock))
<b>Location</b>	/simnet/libsrc/libcomm/bufpool.c Sec. 2.14.4.1

<b>Define</b>	STILL_IN_BOUNDS X(x)
<b>Expansion</b>	(x_pos ? (x) < x_max_tdb : (x) >= 0)
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	STILL_IN_BOUNDS Y(y)
<b>Expansion</b>	(y_pos ? (y) < y_max_tdb : (y) >= 0)
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	SWITCH(c, argcount, func)
<b>Expansion</b>	((int) 'c', argcount, (int) func).
<b>Location</b>	/simnet/libsrc/libcomm/libcomm.h Sec. 2.14.4.3

<b>Define</b>	TABLE_APPLIES_TO_FUNCTION(table,safobj)
<b>Expansion</b>	((table) == TABLE_200)    (OBJ_FORCEID((safobj)) == targetForceID)    (((table) == TABLE_DIST_3500) && (OBJ_FORCEID((safobj)) == distinguishedForceID))    (((table) == TABLE_OTHER_3500) && (OBJ_FORCEID((safobj)) == otherForceID)))
<b>Location</b>	/simnet/src/host/iterator.h Sec. 2.9.3.2

<b>Define</b>	TABLE_SIZE_FUNCTION(table)
<b>Expansion</b>	((table) ? 3500 : 200)
<b>Location</b>	/simnet/src/host/iterator.h Sec. 2.9.3.2

<b>Define</b>	VEC_ADD_2D(a, b, c)
<b>Expansion</b>	(c)->x = (a)->x + (b)->x; (c)->y = (a)->y + (b)->y
<b>Location</b>	/simnet/libsrc/libquad/libquad.h Sec. 2.12.1.18

<b>Define</b>	VEC_ANGLE_2D(a)
<b>Expansion</b>	((a)->x == 0.0 && ((a)->y == 0.0)) ? 0.0 : atan2((a)->y, (a)->x)
<b>Location</b>	/simnet/libsrc/libquad/libquad.h Sec. 2.12.1.18

<b>Define</b>	VEC LONGER2(a,b)
<b>Expansion</b>	$(((*a)*(*a) + ((a[1])*((a[1])) > ((*b)*(*b) + ((b[1])*((b[1]))$
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	VEC LONGER3(a,b)
<b>Expansion</b>	$(((*a)*(*a) + ((a[1])*((a[1])) + ((a[2])*((a[2])) > ((*b)*(*b) + ((b[1])*((b[1])) + ((b[2])*((b[2]))$
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	VEC SCALE 2D(a, b, c)
<b>Expansion</b>	(c)->x = (a)->x * b; (c)->y = (a)->y * b
<b>Location</b>	/simnet/libsrc/libquad/libquad.h Sec. 2.12.1.18

<b>Define</b>	VEC SMALLER2(a,k)
<b>Expansion</b>	$(((*a)*(*a) + ((a[1])*((a[1])) < (k)*(k))$
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	VEC SMALLER3(a,k)
<b>Expansion</b>	$(((*a)*(*a) + ((a[1])*((a[1])) + ((a[2])*((a[2])) < (k)*(k))$
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	VEC SUB 2D(a, b, c)
<b>Expansion</b>	(c)->x = (a)->x - (b)->x; (c)->y = (a)->y - (b)->y
<b>Location</b>	/simnet/libsrc/libquad/libquad.h Sec. 2.12.1.18

<b>Define</b>	VEHICLEID
<b>Expansion</b>	safobj->entity->vehivleID
<b>Location</b>	/simnet/src/host/flyingveh.h Sec. 2.6.4.7

<b>Define</b>	XC(D)
<b>Expansion</b>	(use x ? x from + (x_pos ? (D) : -(D)) : x from + (y_pos ? (D) : -(D)) * x slope)
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	YC(D)
<b>Expansion</b>	(use x ? y from + (x_pos ? (D) : -(D)) * y slope : y from + (y_pos ? (D) : -(D)))
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	abs(x) /* return the absolute value of x */
<b>Expansion</b>	$((x) >= 0) ? (x) : (-x))$
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	abs(x) /* return the absolute value of x */
<b>Expansion</b>	$((x) >= 0) ? (x) : (-x))$
<b>Location</b>	/simnet/include/saf/src/abs.h Sec. 2.13.3.2

<b>Define</b>	allocate airveh()
<b>Expansion</b>	(AIRVEH_VARS *)heap_allocate(sizeof(AIRVEH_VARS))
<b>Location</b>	/simnet/src/host/veh storage.h Sec. 2.9.1.2

<b>Define</b>	allocate area cm()
<b>Expansion</b>	(AREA_CM *)heap allocate(sizeof(AREA_CM))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	allocate cis()
<b>Expansion</b>	(CIS *)heap allocate(sizeof(CIS))
<b>Location</b>	/simnet/src/host/cis.h Sec. 2.10.1.2

<b>Define</b>	allocate collision()
<b>Expansion</b>	(COLLISION_VARS *)heap allocate(sizeof(COLLISION_VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate commander()
<b>Expansion</b>	(COMMANDER_VARS *)heap allocate(sizeof(COMMANDER_VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate composite()
<b>Expansion</b>	(COMPOSITE_VARS *)heap allocate(sizeof(COMPOSITE_VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate control measure()
<b>Expansion</b>	(CONTROL_MEASURE *)heap allocate(sizeof(CONTROL_MEASURE))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	allocate control measure list item()
<b>Expansion</b>	(CONTROL_MEASURE_LIST *) heap allocate(sizeof(CONTROL_MEASURE_LIST))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	allocate damage()
<b>Expansion</b>	(DAMAGE_VARS *)heap allocate(sizeof(DAMAGE_VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate detection()
<b>Expansion</b>	(DETECTION_VARS *)heap allocate(sizeof(DETECTION_VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate driver()
<b>Expansion</b>	(DRIVER_VARS *)heap allocate(sizeof(DRIVER_VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate entity()
<b>Expansion</b>	(ENTITY_VARS *)heap allocate(sizeof(ENTITY_VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate groundveh()
<b>Expansion</b>	(GROUNDVEH_VARS *)heap allocate(sizeof(GROUNDVEH_VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate line cm()
<b>Expansion</b>	(LINE CM *)heap_allocate(sizeof(LINE CM))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	allocate logistics()
<b>Expansion</b>	(LOGISTICS VARS *)heap_allocate(sizeof(LOGISTICS VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate missile()
<b>Expansion</b>	(MISSILE VARS *)heap_allocate(sizeof(MISSILE VARS))
<b>Location</b>	/simnet/src/host/missile.h Sec. 2.6.9.2

<b>Define</b>	allocate navigator()
<b>Expansion</b>	(NAVIGATOR VARS *)heap_allocate(sizeof(NAVIGATOR VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate overlay()
<b>Expansion</b>	(OVERLAY *)heap_allocate(sizeof(OVERLAY))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	allocate overlay list item()
<b>Expansion</b>	(OVERLAY LIST *)heap_allocate(sizeof(OVERLAY LIST))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	allocate pilot()
<b>Expansion</b>	(PILOT VARS *)heap_allocate(sizeof(PILOT VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate point cm()
<b>Expansion</b>	(POINT CM *)heap_allocate(sizeof(POINT CM))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	allocate predicates()
<b>Expansion</b>	(PREDICATES *)heap_allocate(sizeof(PREDICATES))
<b>Location</b>	/simnet/src/host/predicates.h Sec. 2.10.1.4

<b>Define</b>	allocate remote()
<b>Expansion</b>	(REMOTE VARS *)heap_allocate(sizeof(REMOTE VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate rem veh id list()
<b>Expansion</b>	(REM_VEH_ID_LIST *)heap_allocate(sizeof(REM_VEH_ID_LIST))
<b>Location</b>	/simnet/src/host/reporter.h Sec. 2.8.2.2

<b>Define</b>	allocate reporter()
<b>Expansion</b>	(REPORTER VARS *)heap_allocate(sizeof(REPORTER VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2



<b>Define</b>	allocate route()
<b>Expansion</b>	(ROUTE *)heap allocate(sizeof(ROUTE))
<b>Location</b>	/simnet/src/host/route.h Sec. 2.10.2.5

<b>Define</b>	allocate routepoint()
<b>Expansion</b>	(ROUTEPOINT *)heap allocate(sizeof(ROUTEPOINT))
<b>Location</b>	/simnet/src/host/route.h Sec. 2.10.2.5

<b>Define</b>	allocate saf vehicle()
<b>Expansion</b>	(SAF_VEHICLE_VARS *)heap allocate(sizeof(SAF_VEHICLE_VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate sbx connection()
<b>Expansion</b>	(SBX_CONNECTION_VARS *) heap allocate(sizeof(SBX_CONNECTION_VARS))
<b>Location</b>	/simnet/src/host/sbx.h Sec. 2.4.3.3

<b>Define</b>	allocate shell summary()
<b>Expansion</b>	(SHELL_SUMMARY *)heap allocate(sizeof(SHELL_SUMMARY))
<b>Location</b>	/simnet/src/host/reporter.h Sec. 2.8.2.2

<b>Define</b>	allocate spotter()
<b>Expansion</b>	(SPOTTER_VARS *)heap allocate(sizeof(SPOTTER_VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate targeting()
<b>Expansion</b>	(TARGETING_VARS *)heap allocate(sizeof(TARGETING_VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate tickable()
<b>Expansion</b>	(TICKABLE_VARS *)heap allocate(sizeof(TICKABLE_VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate turret()
<b>Expansion</b>	(TURRET_VARS *)heap allocate(sizeof(TURRET_VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate veh cluster()
<b>Expansion</b>	(VEH_CLUSTER *)heap allocate(sizeof(VEH_CLUSTER))
<b>Location</b>	/simnet/src/host/reporter.h Sec. 2.8.2.2

<b>Define</b>	allocate vehicle()
<b>Expansion</b>	(VEHICLE_VARS *)heap allocate(sizeof(VEHICLE_VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate veh id list()
<b>Expansion</b>	(VEH_ID_LIST *)heap allocate(sizeof(VEH_ID_LIST))
<b>Location</b>	/simnet/src/host/reporter.h Sec. 2.8.2.2

<b>Define</b>	allocate weapon systems()
<b>Expansion</b>	(WEAPON_SYSTEMS_VARS *)heap_allocate(sizeof (WEAPON_SYSTEMS_VARS))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	allocate zone cm()
<b>Expansion</b>	(ZONE_CM *)heap_allocate(sizeof (ZONE_CM))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	almost_eq(x, y, e)
<b>Expansion</b>	((abs((x) - (y)) <= (e)) ? TRUE : FALSE)
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	buffer from char(p)
<b>Expansion</b>	((BUFFER *) (p - sizeof(BUFFER)))
<b>Location</b>	/simnet/libsrc/libcomm/libcomm.h Sec. 2.14.4.3

<b>Define</b>	char from buffer(bp)
<b>Expansion</b>	((BYTE_POINTER)((BYTE_POINTER)bp + sizeof(BUFFER)))
<b>Location</b>	/simnet/libsrc/libcomm/libcomm.h Sec. 2.14.4.3

<b>Define</b>	coords within database(x,y)
<b>Expansion</b>	((appearance & (vehDestroyed   vehFlaming))    ((appearance & vehMobilityDisabled) && ((appearance & vehFirepowerDisabled)    (simnet_class != vehicleClassTank))))
<b>Location</b>	/simnet/src/host/phantom.h Sec. 2.13.3.1

<b>Define</b>	copysign(x,y)
<b>Expansion</b>	((x)>=0.0 ? (fabs(y)) : ((fabs(y))*-(1.0)))
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	database hitmodel query(weapon, range, view)
<b>Expansion</b>	interpolate_curve(weapon[view + 2].array, range)
<b>Location</b>	/simnet/libsrc/libdatabase/libdatabase.h Sec. 2.6.8.9

<b>Define</b>	deallocate airveh(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate area cm(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	deallocate cis(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/cis.h Sec. 2.10.1.2

<b>Define</b>	deallocate collision(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate_commander(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/veh storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate_composite(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/veh storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate_control_measure(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	deallocate_control_measure_list_item(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	deallocate_damage(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/veh storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate_detection(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/veh storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate_driver(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/veh storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate_entity(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/veh storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate_groundveh(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/veh storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate_line_cm(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	deallocate_logistics(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/veh storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate_missile(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/missile.h Sec. 2.6.9.2

<b>Define</b>	deallocate navigator(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate overlay(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	deallocate overlay_list_item(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	deallocate pilot(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate point_cm(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	deallocate predicates(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/predicates.h Sec. 2.10.1.4

<b>Define</b>	deallocate rem_veh_id_list(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/reporter.h Sec. 2.8.2.2

<b>Define</b>	deallocate reporter(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate route(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/route.h Sec. 2.10.2.5

<b>Define</b>	deallocate routepoint(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/route.h Sec. 2.10.2.5

<b>Define</b>	deallocate saf_vehicle(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/veh_storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate shell_summary(x)
<b>Expansion</b>	(heap_deallocate(x))
<b>Location</b>	/simnet/src/host/reporter.h Sec. 2.8.2.2

<b>Define</b>	deallocate targeting(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/veh storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate tickable(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/veh storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate turret(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/veh storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate veh id list(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/reporter.h Sec. 2.8.2.2

<b>Define</b>	deallocate veh cluster(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/reporter.h Sec. 2.8.2.2

<b>Define</b>	deallocate vehicle(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/veh storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate weapon systems(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/veh storage.h Sec. 2.9.1.2

<b>Define</b>	deallocate zone cm(x)
<b>Expansion</b>	(heap deallocate(x))
<b>Location</b>	/simnet/src/host/cm.h Sec. 2.10.2.2

<b>Define</b>	ecmderr()
<b>Expansion</b>	{ printf("ecmderr\n"); }
<b>Location</b>	/simnet/libsrc/libparser/kludge.c Sec. 2.5.1.10

<b>Define</b>	eq(x, y, e) /* (y-e) <= x <= (y+e) where e is an appropriate tolerance */
<b>Expansion</b>	((abs((x) - (y)) <= (e)) ? 1 : 0)
<b>Location</b>	/simnet/include/saf/src/tolerance.h Sec. 2.13.3.7

<b>Define</b>	extract_bit(bit_num, bitfield)
<b>Expansion</b>	(1 & ((bitfield)[(bit_num) / 8] >> ((bit_num) % 8)))
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	gethost()
<b>Expansion</b>	{ printf("gethost\n"); }
<b>Location</b>	/simnet/libsrc/libparser/kludge.c Sec. 2.5.1.10

<b>Define</b>	getnet()
<b>Expansion</b>	{ printf("getnet\n"); }
<b>Location</b>	/simnet/libsrc/libparser/kludge.c Sec. 2.5.1.10

<b>Define</b>	hostname()
<b>Expansion</b>	{ printf("hostname\n"); }
<b>Location</b>	/simnet/libsrc/libparser/kludge.c Sec. 2.5.1.10

<b>Define</b>	is_dead(appearance, simnet_class)
<b>Expansion</b>	((appearance & (vehDestroyed   vehFlaming))    ((appearance & vehMobilityDisabled) && ((appearance & vehFirepowerDisabled)    (simnet_class != vehicleClassTank))))
<b>Location</b>	/simnet/src/host/phantom.h Sec. 2.13.3.1

<b>Define</b>	is_enemy(my_team, his_team)
<b>Expansion</b>	((my_team == distinguishedForceID) && ((his_team == otherForceID)    (his_team == targetForceID)))    ((my_team == otherForceID) && (his_team == distinguishedForceID)    (his_team == targetForceID)))
<b>Location</b>	/simnet/src/host/phantom.h Sec. 2.13.3.1

<b>Define</b>	isbadhost()
<b>Expansion</b>	{ printf("isbadhost\n"); }
<b>Location</b>	/simnet/libsrc/libparser/kludge.c Sec. 2.5.1.10

<b>Define</b>	isbadnett()
<b>Expansion</b>	{ printf("isbadnett\n"); }
<b>Location</b>	/simnet/libsrc/libparser/kludge.c Sec. 2.5.1.10

<b>Define</b>	kph to_mph(s)
<b>Expansion</b>	((s) * (1000.0 / (3600.0 * 15.0)))
<b>Location</b>	/simnet/src/host/phantom.h Sec. 2.13.3.1

<b>Define</b>	kph to mps(s)
<b>Expansion</b>	((s) * 1000.0 / 3600.0)
<b>Location</b>	/simnet/src/host/phantom.h Sec. 2.13.3.1

<b>Define</b>	math to compass(rad)
<b>Expansion</b>	(angle clip(PI OVER 2-rad))
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	max(a, b) /* Returns the maximum value of a and b */
<b>Expansion</b>	((a) >= (b)) ? (a) : (b)
<b>Location</b>	/simnet/include/saf/src/minmax.h Sec. 2.13.3.5

<b>Define</b>	max(a, b) /* Returns the maximum value of a and b */
<b>Expansion</b>	((a) >= (b)) ? (a) : (b)
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	min(a, b) /* Returns the minimum value of a and b */
<b>Expansion</b>	((a <= b) ? (a) : (b))
<b>Location</b>	/simnet/include/saf/src/minmax.h Sec. 2.13.3.5

<b>Define</b>	min(a, b) /* Returns the minimum value of a and b */
<b>Expansion</b>	((a <= b) ? (a) : (b))
<b>Location</b>	/simnet/libsrc/libpvis/pve.h Sec. 2.6.7.3

<b>Define</b>	min3(a, b, c)
<b>Expansion</b>	((a < b) ? ((a < c) ? a : c) : ((b < c) ? b : c))
<b>Location</b>	/simnet/libsrc/libsched/sched.c Sec. 2.2.1.5

<b>Define</b>	mpf to mps(s)
<b>Expansion</b>	((s) * 15.0)
<b>Location</b>	/simnet/src/host/phantom.h Sec. 2.13.3.1

<b>Define</b>	mps to knots(s)
<b>Expansion</b>	((s) * 1000.0 / 3600.0)
<b>Location</b>	/simnet/src/host/phantom.h Sec. 2.13.3.1

<b>Define</b>	mps to kph(s)
<b>Expansion</b>	((s) * 3600.0 / 1000.0)
<b>Location</b>	/simnet/src/host/phantom.h Sec. 2.13.3.1

<b>Define</b>	mps to mpf(s)
<b>Expansion</b>	((s) / 15.0)
<b>Location</b>	/simnet/src/host/phantom.h Sec. 2.13.3.1

<b>Define</b>	netfmt()
<b>Expansion</b>	{ printf("netfmt\n"); }
<b>Location</b>	/simnet/libsrc/libparser/kludge.c Sec. 2.5.1.10

<b>Define</b>	p_arg0(x)
<b>Expansion</b>	(char *)((x)->p command)
<b>Location</b>	/simnet/libsrc/libparser/libparser.h Sec. 2.5.1.11

<b>Define</b>	point in rect(pp, rp)
<b>Expansion</b>	((pp[X] >= (rp)->left) && ((pp[X] <= (rp)->right) && ((pp[Y] >= (rp)bottom) && ((pp[Y] <= (rp)->top))
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	reflect x axis(y)
<b>Expansion</b>	{ y = -y; }
<b>Location</b>	/simnet/libsrc/libquad/minimum clip.c Sec. 2.12.1.13

<b>Define</b>	reflect x minus y(x, y)
<b>Expansion</b>	{ INT32 t; t = x; x = -y; y = -t; }
<b>Location</b>	/simnet/libsrc/libquad/minimum clip.c Sec. 2.12.1.13

<b>Define</b>	rotate 90 c(x, y)
<b>Expansion</b>	{INT32 t; t = x; x = y; y = -t;}
<b>Location</b>	/simnet/libsrc/libquad/minimum clip.c Sec. 2.12.1.13

<b>Define</b>	rotate 180 c(x, y)
<b>Expansion</b>	{x = -x; y = -y;}
<b>Location</b>	/simnet/libsrc/libquad/minimum clip.c Sec. 2.12.1.13

<b>Define</b>	rotate 270 c(x, y)
<b>Expansion</b>	{INT32 t; t = x; x = -y; y = t;}
<b>Location</b>	/simnet/libsrc/libquad/minimum clip.c Sec. 2.12.1.13

<b>Define</b>	s atan2(x,y)
<b>Expansion</b>	((!(x)==0.0)&&((y)==0.0)) ? 0.0 : atan2(x,y)
<b>Location</b>	/simnet/libsrc/libutil/libutil.h Sec. 2.14.3.9

<b>Define</b>	step(x, y, e) /* If  x-y  <= e then return z, else return x */
<b>Expansion</b>	((abs((x) - (z)) <= (e)) ? (z) : (x))
<b>Location</b>	/simnet/include/saf/src/tolerance.h Sec. 2.13.3.7

<b>Define</b>	symbols_compare(x,y)
<b>Expansion</b>	#ifndef NO_SYMBOLS ((int)(x)-(int)(y)) #else NO_SYMBOLS (strcmp((x),(y)))
<b>Location</b>	/simnet/libsrc/libreader/libreader.h Sec. 2.1.1.5

<b>Define</b>	symbols_match(x,y)
<b>Expansion</b>	#ifndef NO_SYMBOLS ((x)==(y)) #else NO_SYMBOLS (strcmp((x),(y))==0)
<b>Location</b>	/simnet/libsrc/libreader/libreader.h Sec. 2.1.1.5

<b>Define</b>	type_ok(v type, match type)
<b>Expansion</b>	((v type) & (match type))
<b>Location</b>	/simnet/src/host/iterator.h Sec. 2.9.3.2



## APPENDIX B

This appendix consists of an alphabetical list of the CSUs in this document along with their directory paths and section numbers.

CSU	Path	Section
_queue_hanger_hang_this	/simnet/libsrc/libcomm/queue_fix.c	2.14.4.2.3
_queue_hanger_unhang	/simnet/libsrc/libcomm/queue_fix.c	2.14.4.2.4
abort_handler	/simnet/src/host/main.c	2.1.3.1.20
abs.h	/simnet/include/saf/src/abs.h	2.13.3.2
acquire_target	/simnet/src/host/gunner.c	2.6.9.5.1
action_drill_needed	/simnet/src/host/predicates.c	2.10.1.3.6
activate_new_cis	/simnet/src/host/cis.c	2.10.1.1.16
add_executing_unit	/simnet/src/host/cm.c	2.10.2.1.21
add_into_spotter_table	/simnet/src/host/spotter.c	2.8.2.3.9
add_last_hit	/simnet/libsrc/libpvis/pve_checkvis.c	2.6.7.1.24
add_removed_vehicle	/simnet/src/host/reporter.c	2.8.2.1.29
add_shelling_to_cluster	/simnet/src/host/reporter.c	2.8.2.1.37
add_to_free_list	/simnet/libsrc/libheap/alloc.c	2.14.2.1.9
add_vehicle_to_cluster	/simnet/src/host/reporter.c	2.8.2.1.20
add_weapons_status	/simnet/src/host/weapons.c	2.6.9.8.12
adjust_behaviors	/simnet/src/host/cis.c	2.10.1.1.15
agl_to_abs_altitude	/simnet/src/host/pilot.c	2.6.4.2.9
air_raid_happening	/simnet/src/host/predicates.c	2.10.1.3.4
air_raid_over	/simnet/src/host/predicates.c	2.10.1.3.5
air_tick	/simnet/src/host/flyingveh.c	2.6.4.6.5
airveh_catastrophic_kill	/simnet/src/host/flyingveh.c	2.6.4.6.7
airveh_init	/simnet/src/host/flyingveh.c	2.6.4.6.1
airveh_mobility_kill	/simnet/src/host/flyingveh.c	2.6.4.6.6
airveh_show	/simnet/src/host/flyingveh.c	2.6.4.6.4
align_points	/simnet/libsrc/libquad/skirt_water.c	2.12.1.12.3
all_wide_segments_through_water	/simnet/libsrc/libquad/water_check.c	2.12.1.4.8
Alloc	/simnet/libsrc/libparser/par_unix.c	2.5.1.9.1
allocate_bitfield	/simnet/libsrc/libutil/bitfield.c	2.14.3.4.1
allocate_points	/simnet/libsrc/libquad/terrain.c	2.12.1.1.5
allocate_safobj	/simnet/src/host/safobj.c	2.2.2.2
allocate_spotter_tables	/simnet/src/host/spotter.c	2.8.2.3.3
ammo_to_shell_type	/simnet/src/host/reporter.c	2.8.2.1.34
and_bitfield	/simnet/libsrc/libutil/bitfield.c	2.14.3.4.9
angle_between_vectors	/simnet/libsrc/libutil/math.c	2.14.3.5.7
angle_clip	/simnet/libsrc/libutil/math.c	2.14.3.5.4
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buf_rudp_open	/simnet/libsrc/libudp/buf_conn.c	2.4.2.5.3
buf_rudp_tick	/simnet/libsrc/libudp/buf_conn.c	2.4.2.5.13
buf_rudp_write_message	/simnet/libsrc/libudp/buf_conn.c	2.4.2.5.12
buff_rudp_read_message	/simnet/libsrc/libudp/buf_conn.c	2.4.2.5.11
buff_rudp_show	/simnet/libsrc/libudp/buf_conn.c	2.4.2.5.2
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buffer_allocate	/simnet/libsrc/libcomm/queue_fix.c	2.14.4.2.12
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buffer_simple_enqueue	/simnet/libsrc/libcomm/bufpool.c	2.14.4.1.14
buffer_simple_flush	/simnet/libsrc/libcomm/bufpool.c	2.14.4.1.16
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cm_delete_cm_from_overlay	/simnet/src/host/cm.c	2.10.2.1.15
cm_delete_overlay	/simnet/src/host/cm.c	2.10.2.1.13
cm_execute_overlay	/simnet/src/host/cm.c	2.10.2.1.20
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cm_find_cm_list_item	/simnet/src/host/cm.c	2.10.2.1.6
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cm_get_center_of_mass	/simnet/src/host/navigator.c	2.10.2.3.15
cm_get_cm_from_overlay	/simnet/src/host/cm.c	2.10.2.1.17
cm_intersection	/simnet/src/host/navigator.c	2.10.2.3.13
cm_point_inside_polygon	/simnet/src/host/navigator.c	2.10.2.3.16
cm_point_line_intersection	/simnet/src/host/navigator.c	2.10.2.3.18
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commander_change_altitude	/simnet/src/host/commander.c	2.8.1.1.26
commander_change_formation	/simnet/src/host/commander.c	2.8.1.1.16
commander_change_speed	/simnet/src/host/commander.c	2.8.1.1.14
commander_execute_overlay	/simnet/src/host/commander.c	2.8.1.1.7
commander_executing_order	/simnet/src/host/commander.c	2.8.1.1.6
commander_face_direction	/simnet/src/host/commander.c	2.8.1.1.21
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commander_get_mission_status	/simnet/src/host/commander.c	2.8.1.1.5
commander_goto_point	/simnet/src/host/commander.c	2.8.1.1.19
commander_halt	/simnet/src/host/commander.c	2.8.1.1.11
commander_inferior_changed_status	/simnet/src/host/commander.c	2.8.1.1.22
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commander_note_leader_state	/simnet/src/host/commander.c	2.8.1.1.23
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commander_set_mission_formation	/simnet/src/host/commander.c	2.8.1.1.15
commander_set_mission_speed	/simnet/src/host/commander.c	2.8.1.1.12
commander_show	/simnet/src/host/commander.c	2.2.1.1.4
commander_simulator_in_command	/simnet/src/host/commander.c	2.8.1.1.18
commander_state_string	/simnet/src/host/commander.c	2.2.1.1.3
commander_tick	/simnet/src/host/commander.c	2.8.1.1.9
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composite_add_member_vehicle	/simnet/src/host/composite.c	2.8.1.3.9
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composite_cancel_overlay	/simnet/src/host/composite.c	2.8.1.3.42
composite_change_altitude	/simnet/src/host/composite.c	2.8.1.3.53
composite_change_formation	/simnet/src/host/composite.c	2.8.1.3.47
composite_change_speed	/simnet/src/host/composite.c	2.8.1.3.44
composite_check_unit_strength	/simnet/src/host/composite.c	2.8.1.3.17
composite_distinguished_member	/simnet/src/host/composite.c	2.8.1.3.16
composite_execute_overlay	/simnet/src/host/composite.c	2.8.1.3.40
composite_executing_order	/simnet/src/host/composite.c	2.8.1.3.35
composite_face_direction	/simnet/src/host/composite.c	2.8.1.3.50
composite_fake_resupply	/simnet/src/host/composite.c	2.8.1.3.32
composite_fill_in_appearance_data	/simnet/src/host/composite.c	2.8.1.3.14
composite_fill_in_echelon_data	/simnet/src/host/composite.c	2.8.1.3.12
composite_fill_in_position_data	/simnet/src/host/composite.c	2.8.1.3.13
composite_find_living_vehicle	/simnet/src/host/composite.c	2.8.1.3.15
composite_find_vehicle_for_stealth	/simnet/src/host/composite.c	2.8.1.3.29
composite_follow_vehicle	/simnet/src/host/composite.c	2.8.1.3.45
composite_generate_status_report	/simnet/src/host/composite.c	2.8.1.3.33

composite_get_composite_bumpers	/simnet/src/host/composite.c	2.8.1.3.22
composite_go_away	/simnet/src/host/composite.c	2.8.1.3.2
composite_goto_point	/simnet/src/host/composite.c	2.8.1.3.48
composite_halt	/simnet/src/host/composite.c	2.8.1.3.43
composite_indirect_fire	/simnet/src/host/composite.c	2.8.1.3.21
composite_inferior_changed_status	/simnet/src/host/composite.c	2.8.1.3.37
composite_land	/simnet/src/host/composite.c	2.8.1.3.52
composite_note_leader_state	/simnet/src/host/composite.c	2.8.1.3.36
composite_note_member_vehicle_has_died	/simnet/src/host/composite.c	2.8.1.3.38
composite_pro_sim	/simnet/src/host/composite.c	2.8.1.3.20
composite_readjust_overlay	/simnet/src/host/composite.c	2.8.1.3.41
composite_reassign_current_formation	/simnet/src/host/composite.c	2.8.1.3.27
composite_rejoin_unit	/simnet/src/host/composite.c	2.8.1.3.39
composite_remove_inferior_composite	/simnet/src/host/composite.c	2.8.1.3.6
composite_remove_inferior_vehicle	/simnet/src/host/composite.c	2.8.1.3.8
composite_remove_member_vehicle	/simnet/src/host/composite.c	2.8.1.3.10
composite_remove_vehicles	/simnet/src/host/composite.c	2.8.1.3.34
composite_resume_mission	/simnet/src/host/composite.c	2.8.1.3.49
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composite_set_recursive_ids	/simnet/src/host/composite.c	2.8.1.3.23
composite_set_sbx_ids	/simnet/src/host/composite.c	2.8.1.3.24
composite_set_superior	/simnet/src/host/composite.c	2.8.1.3.4
composite_set_targeting_parameters	/simnet/src/host/composite.c	2.8.1.3.31
composite_show	/simnet/src/host/composite.c	2.8.1.3.3
composite_simulator_in_command	/simnet/src/host/composite.c	2.8.1.3.46
composite_start_ticking	/simnet/src/host/composite.c	2.8.1.3.11
composite_teleport_to_station	/simnet/src/host/composite.c	2.8.1.3.28
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compute_enemy_weight	/simnet/src/host/detection.c	2.6.5.1.7
compute_explosion_point	/simnet/src/host/missile.c	2.6.9.1.9
compute_interest_direction	/simnet/src/host/detection.c	2.6.5.1.8
compute_mid	/simnet/libsrc/libpvis/pve_checkvis.c	2.6.7.1.10
compute_situation	/simnet/src/host/pilot.c	2.6.4.2.20
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copy_list	/simnet/libsrc/libquad/list.c	2.12.1.7.14
copy_matrix_row_to_vector	/simnet/libsrc/libutil/math.c	2.14.3.5.18
copy_stack_to_array	/simnet/libsrc/libreader/parser.y	2.1.1.1.5
copy_xy_on_tdb	/simnet/src/host/misc.c	2.14.1.2.5
CopyEarlierCommand	/simnet/libsrc/libparser/par_hist.c	2.5.1.8.2
count_bits	/simnet/libsrc/libutil/bitfield.c	2.14.3.4.10
count_forces	/simnet/src/host/parser.c	2.5.2.1.13
count_hosts	/simnet/src/host/parser.c	2.5.2.1.15
count_intersections	/simnet/libsrc/libquad/intersection.c	2.12.1.14.4
count_sites	/simnet/src/host/parser.c	2.5.2.1.14
count_vehicles	/simnet/src/host/parser.c	2.5.2.1.12

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create_bridges	/simnet/libsrc/libquad/bridges.c	2.12.1.3.1
create_buildings	/simnet/libsrc/libquad/trees.c	2.12.1.16.5
create_cis	/simnet/src/host/cis.c	2.10.1.1.8
create_collision	/simnet/src/host/collision.c	2.6.3.1.1
create_commander	/simnet/src/host/commander.c	2.8.1.1.1
create_composite	/simnet/src/host/composite.c	2.8.1.3.1
create_contours	/simnet/libsrc/libquad/trees.c	2.12.1.16.7
create_damage	/simnet/src/host/damage.c	2.6.2.1.1
create_detection	/simnet/src/host/detection.c	2.6.5.1.1
create_driver	/simnet/src/host/driver.c	2.6.3.2.1
create_entity	/simnet/src/host/entity.c	2.9.2.1.1
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create_lakes	/simnet/libsrc/libquad/bridges.c	2.12.1.3.3
create_logistics	/simnet/src/host/logistics.c	2.6.6.1.1
create_missile	/simnet/src/host/missile.c	2.6.9.1.3
create_navigator	/simnet/src/host/navigator.c	2.10.2.3.1
create_new_cluster	/simnet/src/host/reporter.c	2.8.2.1.19
create_new_shelling	/simnet/src/host/reporter.c	2.8.2.1.36
create_pilot	/simnet/src/host/pilot.c	2.6.4.2.2
create_predicates	/simnet/src/host/predicates.c	2.10.1.3.1
create_remote	/simnet/usr/host/remote.c	2.7.1.1
create_remote_vehicle	/simnet/usr/host/remote.c	2.7.1.17
create_reporter	/simnet/src/host/reporter.c	2.8.2.1.1
create_river_ints	/simnet/libsrc/libquad/rivers.c	2.12.1.2.3
create_rivers	/simnet/libsrc/libquad/rivers.c	2.12.1.2.1
create_road_ints	/simnet/libsrc/libquad/roads.c	2.12.1.15.3
create_roads	/simnet/libsrc/libquad/roads.c	2.12.1.15.1
create_routepoint	/simnet/src/host/route.c	2.10.2.4.3
create_saf_vehicle	/simnet/src/host/saf_vehicle.c	2.6.1.1.1
create_spotter	/simnet/src/host/spotter.c	2.8.2.3.1
create_targeting	/simnet/src/host/targeting.c	2.6.9.3.2
create_tickable	/simnet/src/host/tickable.c	2.2.3.1
create_tree_canopies	/simnet/libsrc/libquad/trees.c	2.12.1.16.3
create_trees	/simnet/libsrc/libquad/trees.c	2.12.1.16.1
create_turret	/simnet/src/host/turret.c	2.6.9.6.1
create_unit	/simnet/src/host/create.c	2.11.1.2
create_vehicle	/simnet/src/host/vehicle.c	2.9.2.2.1
create_weapon_systems	/simnet/src/host/weapons.c	2.6.9.8.2
crossing_location	/simnet/libsrc/libquad/water_utilities.c	2.12.1.11.9
damage_indirect_fire	/simnet/src/host/damage.c	2.6.2.1.6
damage_string	/simnet/src/host/damage.c	2.6.2.1.3
damage_vehicle_impact	/simnet/src/host/damage.c	2.6.2.1.4
damage_vehicle_rammed	/simnet/src/host/damage.c	2.6.2.1.5
database_detection_query	/simnet/libsrc/libdatabase/detection.c	2.6.8.2.2
database_df_damage_query	/simnet/libsrc/libdatabase/df_damage.c	2.6.8.6.10
database_echelon_lobj_query	/simnet/libsrc/libdatabase/echelon.c	2.6.8.5.3
database_echelon_response_formation_query	/simnet/libsrc/libdatabase/echelon.c	2.6.8.5.4
database_echelon_template_query	/simnet/libsrc/libdatabase/echelon.c	2.6.8.5.2
database_formation_sub_form_query	/simnet/libsrc/libdatabase/formation.c	2.6.8.4.3
database_if_damage_query	/simnet/libsrc/libdatabase/if_damage.c	2.6.8.7.6
database_information_form_query	/simnet/libsrc/libdatabase/formation.c	2.6.8.4.2
database_init	/simnet/src/host/main.c	2.1.3.1.6

database_read	/simnet/libsrc/libdatabase/database.c	2.6.8.8.1
database_read_echelon	/simnet/libsrc/libdatabase/echelon.c	2.6.8.5.1
database_read_formation	/simnet/libsrc/libdatabase/formation.c	2.6.8.4.1
deallocate_bitfield	/simnet/libsrc/libutil/bitfield.c	2.14.3.4.2
deallocate_safobj	/simnet/src/host/safobj.c	2.2.2.3
deallocate_spotter_tables	/simnet/src/host/spotter.c	2.8.2.3.4
debug.h	/simnet/src/host/debug.h	2.5.2.2
debugging_on	/simnet/src/host/main.c	2.1.3.1.7
deferred_fncl	/simnet/libsrc/libsched/fncl.c	2.2.1.1.1
delete	/simnet/libsrc/libquad/list.c	2.12.1.7.7
Delete1Backward	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.17
Delete1Forward	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.13
delete_last_item	/simnet/libsrc/libquad/list.c	2.12.1.7.12
DeleteChar	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.26
DeleteWord	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.22
describe_symbol_table	/simnet/libsrc/libreader/symbol.c	2.1.1.3.4
destroy_airveh	/simnet/src/host/flyingveh.c	2.6.4.6.3
destroy_area_cm	/simnet/src/host/cm.c	2.10.2.1.26
destroy_cis	/simnet/src/host/cis.c	2.10.1.1.9
destroy_cm	/simnet/src/host/cm.c	2.10.2.1.29
destroy_cm_data	/simnet/src/host/cm.c	2.10.2.1.24
destroy_cm_list	/simnet/src/host/cm.c	2.10.2.1.31
destroy_cm_list_item	/simnet/src/host/cm.c	2.10.2.1.30
destroy_collision	/simnet/src/host/collision.c	2.6.3.1.2
destroy_commander	/simnet/src/host/commander.c	2.8.1.1.2
destroy_damage	/simnet/src/host/damage.c	2.6.2.1.2
destroy_detection	/simnet/src/host/detection.c	2.6.5.1.3
destroy_driver	/simnet/src/host/driver.c	2.6.3.2.2
destroy_entity	/simnet/src/host/entity.c	2.9.2.1.2
destroy_grid_entry_list	/simnet/src/host/iterator.c	2.9.3.1.13
destroy_groundveh	/simnet/src/host/groundveh.c	2.6.3.4.2
destroy_line_cm	/simnet/src/host/cm.c	2.10.2.1.28
destroy_logistics	/simnet/src/host/logistics.c	2.6.6.1.2
destroy_missile	/simnet/src/host/missile.c	2.6.9.1.4
destroy_navigator	/simnet/src/host/navigator.c	2.10.2.3.2
destroy_overlay	/simnet/src/host/cm.c	2.10.2.1.32
destroy_overlay_list_item	/simnet/src/host/cm.c	2.10.2.1.33
destroy_pilot	/simnet/src/host/pilot.c	2.6.4.2.4
destroy_point_cm	/simnet/src/host/cm.c	2.10.2.1.25
destroy_predicates	/simnet/src/host/predicates.c	2.10.1.3.2
destroy_rem_veh_id_item	/simnet/src/host/reporter.c	2.8.2.1.15
destroy_removed_vehicles	/simnet/src/host/reporter.c	2.8.2.1.14
destroy_reporter	/simnet/src/host/reporter.c	2.8.2.1.2
destroy_route	/simnet/src/host/route.c	2.10.2.4.4
destroy_routepoint	/simnet/src/host/route.c	2.10.2.4.5
destroy_shell_summary	/simnet/src/host/reporter.c	2.8.2.1.17
destroy_shellings	/simnet/src/host/reporter.c	2.8.2.1.16
destroy_spotter	/simnet/src/host/spotter.c	2.8.2.3.2
destroy_targeting	/simnet/src/host/targeting.c	2.6.9.3.3
destroy_tickable	/simnet/src/host/tickable.c	2.2.3.2
destroy_turret	/simnet/src/host/turret.c	2.6.9.6.2
destroy_veh_id_item	/simnet/src/host/reporter.c	2.8.2.1.13
destroy_veh_id_list	/simnet/src/host/reporter.c	2.8.2.1.12
destroy_vehicle	/simnet/src/host/vehicle.c	2.9.2.2.2
destroy_vehicle_cluster	/simnet/src/host/reporter.c	2.8.2.1.11
destroy_vehicle_clusters	/simnet/src/host/reporter.c	2.8.2.1.10
destroy_weapon_systems	/simnet/src/host/weapons.c	2.6.9.8.3
destroy_zone_cm	/simnet/src/host/cm.c	2.10.2.1.27

detect_building_on_path_tick	/simnet/src/host/collision.c	2.6.3.1.10
detect_collision_tick	/simnet/src/host/collision.c	2.6.3.1.13
detect_imminent_collision_tick	/simnet/src/host/collision.c	2.6.3.1.8
detectable	/simnet/src/host/detection.c	2.6.5.1.10
detection_remove_vehicle	/simnet/src/host/detection.c	2.6.5.1.4
detection_save_object	/simnet/src/host/detection.c	2.6.5.1.12
detection_show	/simnet/src/host/detection.c	2.6.5.1.5
detection_show_type	/simnet/src/host/detection.c	2.6.5.1.6
detection_tick	/simnet/src/host/detection.c	2.6.5.1.11
diffraction_diff	/simnet/libsrc/libpvis/pve_checkvis.c	2.6.7.1.30
diffv	/simnet/src/host/misc.c	2.14.1.2.9
dir_to_tan_point	/simnet/src/host/pilot.c	2.6.4.2.10
distance	/simnet/libsrc/libquad/water_utilities.c	2.12.1.11.1
distance_around_path	/simnet/libsrc/libquad/water_utilities.c	2.12.1.11.16
Do_Hash	/simnet/libsrc/libreader/symbol.c	2.1.1.3.5
do_heap_collect	/simnet/libsrc/libheap/alloc.c	2.14.2.1.18
do_heap_statistics	/simnet/libsrc/libheap/alloc.c	2.14.2.1.17
do_heap_verify	/simnet/libsrc/libheap/alloc.c	2.14.2.1.16
do_send	/simnet/src/host/blaster.c	2.15.1.3
DoCommand	/simnet/libsrc/libparser/par_util.c	2.5.1.7.1
DoEscape	/simnet/libsrc/libparser/par_util.c	2.5.1.7.3
DoHelp	/simnet/libsrc/libparser/par_util.c	2.5.1.7.2
dotv	/simnet/src/host/misc.c	2.14.1.2.8
driver.h	/simnet/src/host/driver.h	2.6.3.3
driver_change_speed_cmd	/simnet/src/host/driver.c	2.6.3.2.33
driver_execute_overlay	/simnet/src/host/driver.c	2.6.3.2.17
driver_executing_immediate_command	/simnet/src/host/driver.c	2.6.3.2.15
driver_face_direction_cmd	/simnet/src/host/driver.c	2.6.3.2.30
driver_follow_leader	/simnet/src/host/driver.c	2.6.3.2.19
driver_follow_vehicle_cmd	/simnet/src/host/driver.c	2.6.3.2.28
driver_forget_about_forps	/simnet/src/host/driver.c	2.6.3.2.21
driver_goto_point_cmd	/simnet/src/host/driver.c	2.6.3.2.29
driver_halt_command	/simnet/src/host/driver.c	2.6.3.2.27
driver_mission_completed	/simnet/src/host/driver.c	2.6.3.2.16
driver_remove_vehicles	/simnet/src/host/driver.c	2.6.3.2.3
driver_resume_cmd	/simnet/src/host/driver.c	2.6.3.2.32
driver_resume_from_collision	/simnet/src/host/driver.c	2.6.3.2.26
driver_resume_mission_command	/simnet/src/host/driver.c	2.6.3.2.31
driver_set_direction	/simnet/src/host/driver.c	2.6.3.2.24
driver_set_direction_cmd	/simnet/src/host/driver.c	2.6.3.2.34
driver_set_leader_mis	/simnet/src/host/driver.c	2.6.3.2.18
driver_set_route	/simnet/src/host/driver.c	2.6.3.2.22
driver_set_route_direction_cmd	/simnet/src/host/driver.c	2.6.3.2.35
driver_set_routedirection	/simnet/src/host/driver.c	2.6.3.2.25
driver_set_speed	/simnet/src/host/driver.c	2.6.3.2.23
driver_show	/simnet/src/host/driver.c	2.6.3.2.43
driver_simulator_in_command	/simnet/src/host/driver.c	2.6.3.2.12
driver_stop_mission	/simnet/src/host/driver.c	2.6.3.2.20
driver_tick	/simnet/src/host/driver.c	2.6.3.2.4
eliminate_duplicates	/simnet/src/host/route.c	2.10.2.4.9
eliminate_vehicles	/simnet/src/host/saf.c	2.2.4.4
EmptyLine	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.10
enable_predicate	/simnet/src/host/predicates.c	2.10.1.3.11
enable_predicates	/simnet/src/host/predicates.c	2.10.1.3.12
EndOfLine	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.14
enemy_disposition	/simnet/src/host/predicates.c	2.10.1.3.8
enqueue_on_rcvq	/simnet/src/host/simnet.c	2.3.2.10



entity_fill_in_appearance_data	/simnet/src/host/entity.c	2.9.2.1.6
entity_fill_in_position_data	/simnet/src/host/entity.c	2.9.2.1.5
entity_show	/simnet/src/host/entity.c	2.9.2.1.4
exaggerate_bridges	/simnet/src/host/route.c	2.10.2.4.10
execute_overlay	/simnet/src/host/dispatch.c	2.14.1.1.8
exit_all_sbx_conns	/simnet/src/host/sbx.c	2.4.3.2.2
exit_handler	/simnet/src/host/main.c	2.1.3.1.21
expand_points	/simnet/libsrc/libquad/building_check.c	2.12.1.17.5
expand_road_route	/simnet/src/host/route.c	2.10.2.4.6
extend_bridge	/simnet/libsrc/libquad/extend_crossings.c	2.12.1.10.3
extend_crossing	/simnet/libsrc/libquad/extend_crossings.c	2.12.1.10.1
extend_intersection	/simnet/libsrc/libquad/extend_crossings.c	2.12.1.10.2
extend_segment	/simnet/libsrc/libquad/extend_crossings.c	2.12.1.10.4
fake_resupply	/simnet/src/host/dispatch.c	2.14.1.1.12
FieldGet	/simnet/libsrc/libparser/par_fields.c	2.5.1.5.3
fill_generic_cis_report	/simnet/src/host/cis.c	2.10.1.1.18
fill_in_appearance_data	/simnet/src/host/dispatch.c	2.14.1.1.1
fill_in_echelon_data	/simnet/src/host/dispatch.c	2.14.1.1.2
fill_in_position_data	/simnet/src/host/dispatch.c	2.14.1.1.3
fill_sbx_opfor_header	/simnet/src/host/sbx.c	2.4.3.2.18
final_relax_points	/simnet/libsrc/libquad/water_utilities.c	2.12.1.11.12
find_a_quad	/simnet/libsrc/libquad/search.c	2.12.1.5.1
find_closer_crossing	/simnet/libsrc/libquad/water_utilities.c	2.12.1.11.7
find_closest_building	/simnet/libsrc/libquad/building_check.c	2.12.1.17.3
find_direction_at_crossing	/simnet/libsrc/libquad/water_utilities.c	2.12.1.11.3
find_extra_contour_information	/simnet/libsrc/libquad/trees.c	2.12.1.16.8
find_first_vector	/simnet/libsrc/libquad/water_utilities.c	2.12.1.11.5
find_next_point	/simnet/libsrc/libquad/water_utilities.c	2.12.1.11.8
find_river_bend_points	/simnet/libsrc/libquad/skirt_water.c	2.12.1.12.10
find_river_points	/simnet/libsrc/libquad/skirt_water.c	2.12.1.12.2
find_route	/simnet/libsrc/libquad/water_avoidance.c	2.12.1.8.1
find_route_core	/simnet/libsrc/libquad/water_avoidance.c	2.12.1.8.2
find_segment_cross_points	/simnet/libsrc/libquad/extend_crossings.c	2.12.1.10.5
find_suitable_crossing_route	/simnet/libsrc/libquad/water_avoidance.c	2.12.1.8.4
find_tag	/simnet/libsrc/libreader/tags.c	2.1.1.4.3
find_tag_sorted	/simnet/libsrc/libreader/tags.c	2.1.1.4.7
fire_missile_at_target	/simnet/src/host/missile.c	2.6.9.1.6
fire_weapon_at_target	/simnet/src/host/weapons.c	2.6.9.8.21
firestatus_to_string	/simnet/src/host/targeting.c	2.6.9.3.4
fix_coords	/simnet/libsrc/libpvis/pve_checkvis.c	2.6.7.1.28
fly_missile	/simnet/src/host/missile.c	2.6.9.1.11
fly_round	/simnet/src/host/weapons.c	2.6.9.8.22
flyingveh.h	/simnet/src/host/flyingveh.h	2.6.4.7
fmat_to_rmat	/simnet/libsrc/libutil/math.c	2.14.3.5.16
follow_lake_around	/simnet/libsrc/libquad/skirt_water.c	2.12.1.12.8
follow_water_segment	/simnet/libsrc/libquad/water_avoidance.c	2.12.1.8.3
followvehicle	/simnet/src/host/driver.c	2.6.3.2.14
forceID_to_string	/simnet/src/host/entity.c	2.9.2.1.3
Forward1Char	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.15
ForwardChar	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.24
fragment_route	/simnet/src/host/route.c	2.10.2.4.12
Free	/simnet/libsrc/libparser/par_unix.c	2.5.1.9.2
free_crossings	/simnet/libsrc/libquad/water_utilities.c	2.12.1.11.20
free_function	/simnet/libsrc/libsched/maint.c	2.2.1.3.2
free_list	/simnet/libsrc/libquad/list.c	2.12.1.7.4
free_stack	/simnet/libsrc/libreader/parser.y	2.1.1.1.3
free_water_list	/simnet/libsrc/libquad/water_check.c	2.12.1.4.2
ft_float	/simnet/src/host/misc.c	2.14.1.2.12

ft_int	/simnet/src/host/misc.c	2.14.1.2.11
ft_symbol	/simnet/src/host/misc.c	2.14.1.2.13
ft_table	/simnet/src/host/misc.c	2.14.1.2.14
ft_untagged_table	/simnet/src/host/misc.c	2.14.1.2.15
fvec_copy	/simnet/libsrc/libutil/math.c	2.14.3.5.17
fvec_to_rvec	/simnet/libsrc/libutil/math.c	2.14.3.5.13
gasp	/simnet/src/host/main.c	2.1.3.1.1
generate_a_deactivate	/simnet/src/host/pro_sim.c	2.3.1.1
generate_in_place_route	/simnet/src/host/route.c	2.10.2.4.8
generate_indirect_fire_packet	/simnet/src/host/pro_sim.c	2.3.1.4
generate_route_from_route_msg	/simnet/src/host/route.c	2.10.2.4.7
generate_status_report	/simnet/src/host/dispatch.c	2.14.1.1.11
generate_weapon_hit	/simnet/src/host/weapons.c	2.6.9.8.24
generate_weapon_miss	/simnet/src/host/weapons.c	2.6.9.8.25
get_a_leader	/simnet/src/host/commander.c	2.8.1.1.10
get_args	/simnet/libsrc/libsched/fncl.c	2.2.1.1.3
get_building_indecies	/simnet/libsrc/libquad/building_check.c	2.12.1.17.4
get_control_message	/simnet/src/host/cm.c	2.10.2.1.3
get_formation_layout	/simnet/src/host/formation.c	2.8.1.4.1
get_guises	/simnet/src/host/saf_vehicle.c	2.6.1.1.8
get_i_and_t_from_normal	/simnet/src/host/impact.c	2.6.4.5.2
get_impact_and_trajectory	/simnet/src/host/impact.c	2.6.4.5.1
get_leader_state	/simnet/src/host/driver.c	2.6.3.2.13
get_local_address	/simnet/libsrc/libudp/udp_berkeley.c	2.4.2.1.6
get_me_a_random_fraction	/simnet/libsrc/libutil/random.c	2.14.3.7.1
get_mid_pt	/simnet/libsrc/libpvis/pve_checkvis.c	2.6.7.1.9
get_millisecond_time	/simnet/libsrc/libutil/time.c	2.14.3.3.2
get_next_circle_point	/simnet/src/host/pilot.c	2.6.4.2.23
get_overlay	/simnet/src/host/cm.c	2.10.2.1.2
get_quad_nodes	/simnet/libsrc/libquad/search.c	2.12.1.5.2
get_quad_nodes_internals	/simnet/libsrc/libquad/search.c	2.12.1.5.3
get_quads_in_region	/simnet/libsrc/libquad/water_utilities.c	2.12.1.11.13
get_quads_in_rt_point_region	/simnet/libsrc/libquad/water_utilities.c	2.12.1.11.14
get_quads_in_vector_region	/simnet/libsrc/libquad/water_utilities.c	2.12.1.11.15
get_relative_vehicle_agility	/simnet/src/host/weapons.c	2.6.9.8.20
get_remote_address	/simnet/libsrc/libudp/udp_berkeley.c	2.4.2.1.7
get_sbx_from_port	/simnet/src/host/sbx.c	2.4.3.2.5
get_sender_of_last_packet	/simnet/src/host/simnet.c	2.3.2.15
get_station_info	/simnet/src/host/formation.c	2.8.1.4.10
get_string	/simnet/libsrc/libreader/symbol.c	2.1.1.3.3
get_symbol	/simnet/libsrc/libreader/symbol.c	2.1.1.3.2
get_symbol_value	/simnet/libsrc/libreader/symbol.c	2.1.1.3.6
get_turret	/simnet/src/host/formation.c	2.8.1.4.2
get_unit_direction	/simnet/src/host/driver.c	2.6.3.2.11
get_water_indices	/simnet/libsrc/libquad/water_check.c	2.12.1.4.1
globals.h	/simnet/src/host/globals.h	2.13.1.1
go_away	/simnet/src/host/dispatch.c	2.14.1.1.6
GobbleWord	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.16
grid_locword	/simnet/libsrc/libpvis/pve_checkvis.c	2.6.7.1.27
ground_impact_to_sbx	/simnet/src/host/sbx.c	2.4.3.2.24
ground_level	/simnet/src/host/pilot.c	2.6.4.2.8
groundveh_close_enough	/simnet/src/host/groundveh.c	2.6.3.4.6
groundveh_mobility_kill	/simnet/src/host/groundveh.c	2.6.3.4.5
groundveh_move	/simnet/src/host/groundveh.c	2.6.3.4.3
groundveh_tick	/simnet/src/host/groundveh.c	2.6.3.4.4
gunner_round_fired	/simnet/src/host/gunner.c	2.6.9.5.6
gunner_tick	/simnet/src/host/gunner.c	2.6.9.5.7
has_this_packet_been_acked	/simnet/libsrc/libudp/rel_conn.c	2.4.2.3.14

hasty_attack_needed	/simnet/src/host/predicates.c	2.10.1.3.3
heading_to_compass	/simnet/src/host/reporter.c	2.8.2.1.5
heap_allocate	/simnet/libsrc/libheap/alloc.c	2.14.2.1.1
heap_allocate_distributed	/simnet/libsrc/libheap/alloc.c	2.14.2.1.3
heap_calloc	/simnet/libsrc/libheap/alloc.c	2.14.2.1.2
heap_create	/simnet/libsrc/libheap/create.c	2.14.2.2.2
heap_deallocate	/simnet/libsrc/libheap/alloc.c	2.14.2.1.4
heap_destroy	/simnet/libsrc/libheap/create.c	2.14.2.2.3
heap_hang	/simnet/libsrc/libheap/alloc.c	2.14.2.1.14
heap_inconsistent_action	/simnet/libsrc/libheap/alloc.c	2.14.2.1.13
heap_print_statistics	/simnet/libsrc/libheap/alloc.c	2.14.2.1.10
heap_verify	/simnet/libsrc/libheap/alloc.c	2.14.2.1.12
helo_tick	/simnet/src/host/helo.c	2.6.4.1.1
host_local_vehicle_predicate	/simnet/src/host/iterator.c	2.9.3.1.9
host_loopback_function	/simnet/src/host/simnet.c	2.3.2.6
hull_to_world_from_direction	/simnet/src/host/missile.c	2.6.9.1.1
hull_to_world_from_orientation	/simnet/src/host/flyingveh.c	2.6.4.6.8
icon_from_object_type	/simnet/src/host/map.c	2.4.3.1.9
identify_exercise	/simnet/src/host/parser.c	2.5.2.1.18
identify_version	/simnet/src/host/version.c	2.1.3.2.1
idle_tick	/simnet/src/host/pilot.c	2.6.4.2.60
impact_weapon	/simnet/src/host/weapons.c	2.6.9.8.23
in_object2	/simnet/libsrc/libpvis/pv_bv.c	2.6.7.2.2
indirect_fire_to_sbx	/simnet/src/host/sbx.c	2.4.3.2.23
induce_roll	/simnet/src/host/flyingveh.c	2.6.4.6.11
induce_tail_spin	/simnet/src/host/flyingveh.c	2.6.4.6.10
inflate_rect	/simnet/libsrc/libutil/geometry.c	2.14.3.6.4
init_clocks	/simnet/libsrc/libutil/time.c	2.14.3.3.1
init_free_list	/simnet/libsrc/libheap/alloc.c	2.14.2.1.5
init_global_symbols	/simnet/src/host/symbols.c	2.1.2.1.1
init_grid_entry_list	/simnet/src/host/iterator.c	2.9.3.1.11
init_grid_tables	/simnet/src/host/iterator.c	2.9.3.1.10
init_mappings	/simnet/src/host/map.c	2.4.3.1.1
init_pilot_state_machine	/simnet/src/host/pilot.c	2.6.4.2.3
init_rect	/simnet/libsrc/libutil/geometry.c	2.14.3.6.3
init_safobj_table	/simnet/src/host/safobj.c	2.2.2.1
init_static_matrices	/simnet/src/host/flyingveh.c	2.6.4.6.9
init_stuff	/simnet/src/host/main.c	2.1.3.1.3
init_symbol_table	/simnet/libsrc/libreader/symbol.c	2.1.1.3.1
init_target_items	/simnet/src/host/targeting.c	2.6.9.3.13
init_target_list	/simnet/src/host/targeting.c	2.6.9.3.6
init_terrain_stuff	/simnet/src/host/main.c	2.1.3.1.5
initialize_heap	/simnet/libsrc/libheap/create.c	2.14.2.2.1
initialize_weapon_priority_list	/simnet/src/host/weapons.c	2.6.9.8.13
InitParser	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.2
insert_function	/simnet/libsrc/libsched/maint.c	2.2.1.3.5
insert_grid_entry	/simnet/src/host/iterator.c	2.9.3.1.15
insert_periodic_function	/simnet/libsrc/libsched/maint.c	2.2.1.3.4
InsertChar	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.23
int_dist	/simnet/src/host/formation.c	2.8.1.4.5
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interpolate_curve	/simnet/libsrc/libdatabase/interpolate.c	2.6.8.1.1
intersect_rect	/simnet/libsrc/libutil/geometry.c	2.14.3.6.2
intersection_direction	/simnet/libsrc/libquad/water_utilities.c	2.12.1.11.2
intervis_can_see_pt_to_pt	/simnet/src/host/intervis.c	2.6.5.2.1
intervis_get_high_ground	/simnet/src/host/intervis.c	2.6.5.2.5
intervis_get_view	/simnet/src/host/intervis.c	2.6.5.2.2

intervis_possibly_visible	/simnet/src/host/intervis.c	2.6.5.2.3
intervis_pt_to_pt	/simnet/src/host/intervis.c	2.6.5.2.4
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invoke_functions_until	/simnet/libsrc/libsched/sched.c	2.2.1.5.1
is_probably_a_string	/simnet/libsrc/libreader/tags.c	2.1.1.4.1
isolate_connection	/simnet/src/host/main.c	2.1.3.1.14
issue_reports	/simnet/src/host/reporter.c	2.8.2.1.43
iterator.h	/simnet/src/host/iterator.h	2.9.3.2
KillForward	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.18
kludge.c	/simnet/libsrc/libparser/kludge.c	2.5.1.10
lakes_thru	/simnet/libsrc/libquad/water_check.c	2.12.1.4.12
last_item	/simnet/libsrc/libquad/list.c	2.12.1.7.10
last_item_butlast	/simnet/libsrc/libquad/list.c	2.12.1.7.11
left_bottom_reagion	/simnet/libsrc/libquad/minimum_clip.c	2.12.1.13.4
left_column	/simnet/libsrc/libquad/minimum_clip.c	2.12.1.13.2
left_edge	/simnet/libsrc/libquad/minimum_clip.c	2.12.1.13.5
LeftWord	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.20
length	/simnet/libsrc/libquad/list.c	2.12.1.7.16
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libcomm.h	/simnet/libsrc/libcomm/libcomm.h	2.14.4.3
libdatabase.h	/simnet/libsrc/libdatabase/libdatabase.h	2.6.8.9
libheap.h	/simnet/libsrc/libheap/libheap.h	2.14.2.3
libparser.h	/simnet/libsrc/libparser/libparser.h	2.5.1.11
libquad.h	/simnet/libsrc/libquad/libquad.h	2.12.1.18
libreader.h	/simnet/libsrc/libreader/libreader.h	2.1.1.5
libsched.h	/simnet/libsrc/libsched/libsched.h	2.2.1.6
libutil.h	/simnet/libsrc/libutil/libutil.h	2.14.3.9
line_cross_rect	/simnet/libsrc/libutil/geometry.c	2.14.3.6.1
line_intersection	/simnet/libsrc/libquad/intersection.c	2.12.1.14.8
line_intersection_core	/simnet/libsrc/libquad/intersection.c	2.12.1.14.10
loader_tick	/simnet/usr/host/loader.c	2.6.9.10.1
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logistics_remove_vehicles	/simnet/src/host/logistics.c	2.6.6.1.3
logistics_supply_offer_canceled	/simnet/src/host/logistics.c	2.6.6.1.8
logistics_supply_offer_received	/simnet/src/host/logistics.c	2.6.6.1.9
logistics_tick	/simnet/src/host/logistics.c	2.6.6.1.10
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LookForward	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.28
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lookup_cis_default_speed	/simnet/src/host/cis.c	2.10.1.1.3
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lookup_cis_information	/simnet/src/host/cis.c	2.10.1.1.7
lookup_cis_movement_method	/simnet/src/host/cis.c	2.10.1.1.5
lookup_cis_resumable	/simnet/src/host/cis.c	2.10.1.1.2
lookup_cis_situational	/simnet/src/host/cis.c	2.10.1.1.1
lookup_vehicle_with_range_check	/simnet/src/host/parser.c	2.5.2.1.19
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main	/simnet/src/host/blaster.c	2.15.1.1
main	/simnet/src/host/main.c	2.1.3.1.19
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major_spotter_increase	/simnet/src/host/spotter.c	2.8.2.3.10
make_array	/simnet/libsrc/libreader/parser.y	2.1.1.1.4
make_create_list	/simnet/src/host/create.c	2.11.1.1
make_leader	/simnet/src/host/formation.c	2.8.1.4.8
make_me_non_blocking	/simnet/libsrc/libudp/udp_berkeley.c	2.4.2.1.10
make_polygon	/simnet/libsrc/libutil/geometry.c	2.14.3.6.5
make_vector_2d	/simnet/libsrc/libquad/vector_2d.c	2.12.1.9.1

make_vector_from_angle_magnitude	/simnet/libsrc/libutil/math.c	2.14.3.5.3
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map_echelon_symbol_to_echelon_number	/simnet/src/host/map.c	2.4.3.1.3
map_echelon_type_number_to_echelon_type_symbol	/simnet/src/host/map.c	2.4.3.1.6
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map_role_sym_to_role_number	/simnet/src/host/targeting.c	2.6.9.3.1
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master_rudp_open	/simnet/libsrc/libudp/rel_conn.c	2.4.2.3.4
master_rudp_synch	/simnet/libsrc/libudp/rel_conn.c	2.4.2.3.8
master_udp_open	/simnet/libsrc/libudp/udp_berkeley.c	2.4.2.1.11
member	/simnet/libsrc/libquad/list.c	2.12.1.7.6
messages.h	/simnet/src/host/messages.h	2.4.1.1
minimum_clip	/simnet/libsrc/libquad/minimum_clip.c	2.12.1.13.1
minmax.h	/simnet/include/saf/src/minmax.h	2.13.3.5
missile.h	/simnet/src/host/missile.h	2.6.9.2
missile_deactivate	/simnet/src/host/missile.c	2.6.9.1.8
missile_ground_impact	/simnet/src/host/missile.c	2.6.9.1.7
missile_maybe_hit_target	/simnet/src/host/missile.c	2.6.9.1.10
missile_send_appearance	/simnet/src/host/missile.c	2.6.9.1.13
missile_set_desired_direction	/simnet/src/host/missile.c	2.6.9.1.12
missile_show	/simnet/src/host/missile.c	2.6.9.1.5
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mission_stationpoint	/simnet/src/host/driver.c	2.6.3.2.9
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navigator_entered_zone	/simnet/src/host/navigator.c	2.10.2.3.11
navigator_generate_report	/simnet/src/host/navigator.c	2.10.2.3.19
navigator_left_area	/simnet/src/host/navigator.c	2.10.2.3.10
navigator_left_zone	/simnet/src/host/navigator.c	2.10.2.3.12
navigator_passed_line	/simnet/src/host/navigator.c	2.10.2.3.8
navigator_passed_point	/simnet/src/host/navigator.c	2.10.2.3.7
navigator_reset_overlay	/simnet/src/host/navigator.c	2.10.2.3.5
navigator_set_overlay	/simnet/src/host/navigator.c	2.10.2.3.4
navigator_show	/simnet/src/host/navigator.c	2.10.2.3.3
navigator_tick	/simnet/src/host/navigator.c	2.10.2.3.6
nconc	/simnet/libsrc/libquad/list.c	2.12.1.7.9
ncons	/simnet/libsrc/libquad/list.c	2.12.1.7.2
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network_silent	/simnet/src/host/main.c	2.1.3.1.11
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next_route_point	/simnet/src/host/driver.c	2.6.3.2.7
NextChar	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.7
NextCommand	/simnet/libsrc/libparser/par_hist.c	2.5.1.8.4
noa_damp	/simnet/src/host/misc.c	2.14.1.2.7
normalize_and_rotate	/simnet/libsrc/libquad/water_utilities.c	2.12.1.11.4
nthcdr	/simnet/libsrc/libquad/list.c	2.12.1.7.8
objects	/simnet/libsrc/libpvis/pve_checkvis.c	2.6.7.1.12

obstacles	/simnet/libsrc/libpvis/pve_checkvis.c	2.6.7.1.13
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offset_points	/simnet/libsrc/libquad/skirt_water.c	2.12.1.12.4
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or_bitfield	/simnet/libsrc/libutil/bitfield.c	2.14.3.4.8
orbit_velocity	/simnet/src/host/pilot.c	2.6.4.2.12
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p_follower_am_i_flying_coord	/simnet/src/host/p_follower.c	2.6.4.3.1
p_follower_arrive_at_same_time	/simnet/src/host/p_follower.c	2.6.4.3.5
p_follower_comp_reset_route	/simnet/src/host/p_follower.c	2.6.4.3.4
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p_follower_flip_in_turn	/simnet/src/host/p_follower.c	2.6.4.3.23
p_follower_fly_in_coord_pos	/simnet/src/host/p_follower.c	2.6.4.3.3
p_follower_flying_independent	/simnet/src/host/p_follower.c	2.6.4.3.12
p_follower_followroute_tick	/simnet/src/host/p_follower.c	2.6.4.3.13
p_follower_gen_coord_goal_pnt	/simnet/src/host/p_follower.c	2.6.4.3.9
p_follower_get_wrlc_offset	/simnet/src/host/p_follower.c	2.6.4.3.7
p_follower_goto_pnt_coord	/simnet/src/host/p_follower.c	2.6.4.3.17
p_follower_hoverattack_tick	/simnet/src/host/p_follower.c	2.6.4.3.16
p_follower_hoverhold	/simnet/src/host/p_follower.c	2.6.4.3.18
p_follower_hoverhold_tick	/simnet/src/host/p_follower.c	2.6.4.3.21
p_follower_land	/simnet/src/host/p_follower.c	2.6.4.3.19
p_follower_landhold_tick	/simnet/src/host/p_follower.c	2.6.4.3.20
p_follower_leader_passed_point	/simnet/src/host/p_follower.c	2.6.4.3.14
p_follower_new_rel_rt_pnt	/simnet/src/host/p_follower.c	2.6.4.3.11
p_follower_passed_point	/simnet/src/host/p_follower.c	2.6.4.3.15
p_follower_pnt_in_hard_turn	/simnet/src/host/p_follower.c	2.6.4.3.27
p_follower_pnt_in_no_turn	/simnet/src/host/p_follower.c	2.6.4.3.25
p_follower_pnt_in_shallow_turn	/simnet/src/host/p_follower.c	2.6.4.3.26
p_follower_set_desired_vel	/simnet/src/host/p_follower.c	2.6.4.3.6
p_follower_set_follow	/simnet/src/host/p_follower.c	2.6.4.3.10
p_follower_stop_coord	/simnet/src/host/p_follower.c	2.6.4.3.8
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ParseConvertNumber	/simnet/libsrc/libparser/par_lib.c	2.5.1.6.7
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ParseError	/simnet/libsrc/libparser/par_util.c	2.5.1.7.7
ParseEscapeComplete	/simnet/libsrc/libparser/par_util.c	2.5.1.7.12
ParseFindEndList	/simnet/libsrc/libparser/par_util.c	2.5.1.7.9
ParseGetConstant	/simnet/libsrc/libparser/par_const.c	2.5.1.2.1
ParseGetDecimal	/simnet/libsrc/libparser/par_lib.c	2.5.1.6.1
ParseGetFields	/simnet/libsrc/libparser/par_fields.c	2.5.1.5.1
ParseGetHex	/simnet/libsrc/libparser/par_lib.c	2.5.1.6.2
ParseGetOctal	/simnet/libsrc/libparser/par_lib.c	2.5.1.6.3
ParseGetString	/simnet/libsrc/libparser/par_lib.c	2.5.1.6.4
ParseGetToken	/simnet/libsrc/libparser/par_util.c	2.5.1.7.6
ParseInput	/simnet/libsrc/libparser/par_base.c	2.5.1.1.1
ParseInSet	/simnet/libsrc/libparser/par_util.c	2.5.1.7.5
ParseKeyword	/simnet/libsrc/libparser/par_base.c	2.5.1.1.3
ParseList	/simnet/libsrc/libparser/par_base.c	2.5.1.1.2
ParseMatch	/simnet/libsrc/libparser/par_util.c	2.5.1.7.10
ParseMessage	/simnet/libsrc/libparser/par_util.c	2.5.1.7.8
ParseMustFree	/simnet/libsrc/libparser/par_util.c	2.5.1.7.4
ParseOptional	/simnet/libsrc/libparser/par_lib.c	2.5.1.6.6
ParsePrint	/simnet/libsrc/libparser/par_unix.c	2.5.1.9.3
ParsePutArg	/simnet/libsrc/libparser/par_lib.c	2.5.1.6.5
parser_create	/simnet/src/host/parser.c	2.5.2.1.3

parser_create_vehicle	/simnet/src/host/parser.c	2.5.2.1.33
parser_global_reset	/simnet/src/host/parser.c	2.5.2.1.35
parser_heap_collect	/simnet/src/host/parser.c	2.5.2.1.39
parser_heap_statistics	/simnet/src/host/parser.c	2.5.2.1.36
parser_heap_verify	/simnet/src/host/parser.c	2.5.2.1.37
parser_init	/simnet/src/host/parser.c	2.5.2.1.1
parser_restore_term	/simnet/src/host/parser.c	2.5.2.1.2
parser_send_string	/simnet/src/host/parser.c	2.5.2.1.41
parser_set_targeting_parameters	/simnet/src/host/parser.c	2.5.2.1.40
ParseTableFind	/simnet/libsrc/libparser/par_util.c	2.5.1.7.11
patches	/simnet/libsrc/libpvis/pve_checkvis.c	2.6.7.1.6
perf_monitor_off	/simnet/libsrc/libsched/perf.c	2.2.1.4.2
perf_monitor_on	/simnet/libsrc/libsched/perf.c	2.2.1.4.1
periodic_fnc1	/simnet/libsrc/libsched/fnc1.c	2.2.1.1.2
phantom.h	/simnet/include/saf/src/phantom.h	2.13.3.1
phase_two_collision_check	/simnet/src/host/collision.c	2.6.3.1.15
pilot_cancel_immediate	/simnet/src/host/pilot.c	2.6.4.2.71
pilot_change_altitude_im	/simnet/src/host/pilot.c	2.6.4.2.66
pilot_change_speed_im	/simnet/src/host/pilot.c	2.6.4.2.68
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pilot_face_direction	/simnet/src/host/pilot.c	2.6.4.2.58
pilot_face_direction_im	/simnet/src/host/pilot.c	2.6.4.2.74
pilot_follow_leader	/simnet/src/host/pilot.c	2.6.4.2.80
pilot_follow_leader_tick	/simnet/src/host/p_follower.c	2.6.4.3.22
pilot_follow_vehicle	/simnet/src/host/pilot.c	2.6.4.2.56
pilot_follow_vehicle_im	/simnet/src/host/pilot.c	2.6.4.2.73
pilot_followroute_tick	/simnet/src/host/pilot.c	2.6.4.2.45
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print_tree	/simnet/libsrc/libquad/trees.c	2.12.1.16.2
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queue_exercise	/simnet/libsrc/libcomm/queue_fix.c	2.14.4.2.7
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remote_fill_in_position_data	/simnet/usr/host/remote.c	2.7.1.8
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remote_stop_being_watched	/simnet/usr/host/remote.c	2.7.1.11
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report_tree_block	/simnet/libsrc/libpvis/pve_checkvis.c	2.6.7.1.17
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reporter_show	/simnet/src/host/reporter.c	2.8.2.1.4
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rdp_disconnect	/simnet/libsrc/libudp/rel_conn.c	2.4.2.3.9
rdp_init	/simnet/libsrc/libudp/buf_conn.c	2.4.2.5.1
rdp_init	/simnet/libsrc/libudp/rel_conn.c	2.4.2.3.1
rdp_open	/simnet/libsrc/libudp/rel_conn.c	2.4.2.3.3
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rdp_retransmit_buf	/simnet/libsrc/libudp/rel_conn.c	2.4.2.3.16
rdp_send	/simnet/libsrc/libudp/rel_conn.c	2.4.2.3.13
rdp_send_bare_ack	/simnet/libsrc/libudp/rel_conn.c	2.4.2.3.18
rdp_show	/simnet/libsrc/libudp/rel_conn.c	2.4.2.3.2
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saf_reset_for_workstation	/simnet/src/host/saf.c	2.2.4.2
saf_vehicle_cancel_overlay	/simnet/src/host/saf_vehicle.c	2.6.1.1.47
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saf_vehicle_change_speed	/simnet/src/host/saf_vehicle.c	2.6.1.1.53
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saf_vehicle_est_position	/simnet/src/host/saf_vehicle.c	2.6.1.1.58
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saf_vehicle_face_direction	/simnet/src/host/saf_vehicle.c	2.6.1.1.57
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saf_vehicle_fill_in_position_data	/simnet/src/host/saf_vehicle.c	2.6.1.1.15
saf_vehicle_firepower_kill	/simnet/src/host/saf_vehicle.c	2.6.1.1.22
saf_vehicle_follow_vehicle	/simnet/src/host/saf_vehicle.c	2.6.1.1.54
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saf_vehicle_goto_point	/simnet/src/host/saf_vehicle.c	2.6.1.1.55
saf_vehicle_halt	/simnet/src/host/saf_vehicle.c	2.6.1.1.52
saf_vehicle_indirect_fire	/simnet/src/host/saf_vehicle.c	2.6.1.1.38
saf_vehicle_mimic_vehicle	/simnet/src/host/saf_vehicle.c	2.6.1.1.18
saf_vehicle_mission_completed	/simnet/src/host/saf_vehicle.c	2.6.1.1.40
saf_vehicle_mobility_kill	/simnet/src/host/saf_vehicle.c	2.6.1.1.23
saf_vehicle_next_event_id	/simnet/src/host/saf_vehicle.c	2.6.1.1.28
saf_vehicle_out_of_ammo	/simnet/src/host/saf_vehicle.c	2.6.1.1.32
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saf_vehicle_rejoin_unit	/simnet/src/host/saf_vehicle.c	2.6.1.1.45
saf_vehicle_remove_vehicles	/simnet/src/host/saf_vehicle.c	2.6.1.1.35
saf_vehicle_reset_station_keeper	/simnet/src/host/saf_vehicle.c	2.6.1.1.51
saf_vehicle_resume_mission	/simnet/src/host/saf_vehicle.c	2.6.1.1.56
saf_vehicle_send_appearance	/simnet/src/host/saf_vehicle.c	2.6.1.1.21
saf_vehicle_set_direction	/simnet/src/host/saf_vehicle.c	2.6.1.1.50
saf_vehicle_set_leader	/simnet/src/host/saf_vehicle.c	2.6.1.1.5
saf_vehicle_set_marking	/simnet/src/host/saf_vehicle.c	2.6.1.1.9
saf_vehicle_set_route	/simnet/src/host/saf_vehicle.c	2.6.1.1.48
saf_vehicle_set_speed	/simnet/src/host/saf_vehicle.c	2.6.1.1.49
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sbx_connection_vehicle_reinit	/simnet/src/host/sbx.c	2.4.3.2.32
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set_bitfield	/simnet/libsrc/libutil/bitfield.c	2.14.3.4.7
set_command_printing	/simnet/src/host/parser.c	2.5.2.1.4
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show_df_damage_database	/simnet/libsrc/libdatabase/df_damage.c	2.6.8.6.1
show_df_damage_entry	/simnet/libsrc/libdatabase/df_damage.c	2.6.8.6.6
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show_df_damage_side	/simnet/libsrc/libdatabase/df_damage.c	2.6.8.6.5
show_df_damage_veh	/simnet/libsrc/libdatabase/df_damage.c	2.6.8.6.2
show_df_damage_weapon	/simnet/libsrc/libdatabase/df_damage.c	2.6.8.6.3
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show_if_damage_database	/simnet/libsrc/libdatabase/if_damage.c	2.6.8.7.1
show_if_damage_entry	/simnet/libsrc/libdatabase/if_damage.c	2.6.8.7.5
show_if_damage_veh	/simnet/libsrc/libdatabase/if_damage.c	2.6.8.7.2
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show_vehicle_id_list	/simnet/src/host/reporter.c	2.8.2.1.9
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simple_queue_describe	/simnet/libsrc/libcomm/bufpool.c	2.14.4.1.9
simple_queue_enqueue	/simnet/libsrc/libcomm/bufpool.c	2.14.4.1.1
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simple_queue_is_full	/simnet/libsrc/libcomm/bufpool.c	2.14.4.1.4
simple_queue_is_this_power_of_two	/simnet/libsrc/libcomm/bufpool.c	2.14.4.1.6
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skirt_river_bend	/simnet/libsrc/libquad/skirt_water.c	2.12.1.12.9
skirt_water	/simnet/libsrc/libquad/skirt_water.c	2.12.1.12.1
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spotter_show	/simnet/src/host/spotter.c	2.8.2.3.12
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stealth_site_host_pair	/simnet/src/host/parser.c	2.5.2.1.30
stealth_teleport_to	/simnet/src/host/parser.c	2.5.2.1.32
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tactical_state.h	/simnet/src/host/tactical_state.h	2.8.3.1
tag_error	/simnet/libsrc/libreader/tags.c	2.1.1.4.2
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targeting_set_hold_fire	/simnet/src/host/targeting.c	2.6.9.3.9
targeting_set_parameters	/simnet/src/host/targeting.c	2.6.9.3.11
targeting_show	/simnet/src/host/targeting.c	2.6.9.3.5
targeting_tick	/simnet/src/host/targeting.c	2.6.9.3.21
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tdb_get_zl	/simnet/src/host/misc.c	2.14.1.2.3
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toggle_debugging	/simnet/src/host/parser.c	2.5.2.1.10
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turret.h	/simnet/src/host/turret.h	2.6.9.7
turret_firepower_kill	/simnet/src/host/turret.c	2.6.9.6.10
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turret_point_at_target	/simnet/src/host/turret.c	2.6.9.6.5
turret_scan	/simnet/src/host/turret.c	2.6.9.6.6
turret_set_scan_parms	/simnet/src/host/turret.c	2.6.9.6.8
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udp_conn.h	/simnet/libsrc/libudp/udp_conn.h	2.4.2.2
udp_open	/simnet/libsrc/libudp/udp_berkeley.c	2.4.2.1.1
udp_read	/simnet/libsrc/libudp/udp_berkeley.c	2.4.2.1.4
udp_show	/simnet/libsrc/libudp/udp_berkeley.c	2.4.2.1.3
udp_write	/simnet/libsrc/libudp/udp_berkeley.c	2.4.2.1.5
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update_reporter_vehicles	/simnet/src/host/reporter.c	2.8.2.1.42
update_target_list	/simnet/src/host/targeting.c	2.6.9.3.19
UpdateLine	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.3
UpdateMoveCursor	/simnet/libsrc/libparser/par_edit.c	2.5.1.4.4
valid_quad	/simnet/libsrc/libquad/search.c	2.12.1.5.4
vec2_add	/simnet/libsrc/libutil/math.c	2.14.3.5.22
vec2_copy	/simnet/libsrc/libutil/math.c	2.14.3.5.29
vec2_cross	/simnet/libsrc/libutil/math.c	2.14.3.5.25
vec2_dot	/simnet/libsrc/libutil/math.c	2.14.3.5.24
vec2_init	/simnet/libsrc/libutil/math.c	2.14.3.5.20
vec2_mag	/simnet/libsrc/libutil/math.c	2.14.3.5.26
vec2_mag2	/simnet/libsrc/libutil/math.c	2.14.3.5.27
vec2_norm	/simnet/libsrc/libutil/math.c	2.14.3.5.31
vec2_print	/simnet/libsrc/libutil/math.c	2.14.3.5.19
vec2_range_squared	/simnet/libsrc/libutil/math.c	2.14.3.5.30
vec2_rot90	/simnet/libsrc/libutil/math.c	2.14.3.5.32
vec2_rot90minus	/simnet/libsrc/libutil/math.c	2.14.3.5.33
vec2_rotate	/simnet/src/host/pilot.c	2.6.4.2.22
vec2_scale	/simnet/libsrc/libutil/math.c	2.14.3.5.28
vec2_set	/simnet/libsrc/libutil/math.c	2.14.3.5.21
vec2_sub	/simnet/libsrc/libutil/math.c	2.14.3.5.23
vec2_veh2world	/simnet/src/host/driver.c	2.6.3.2.37
vec2_world2veh	/simnet/src/host/driver.c	2.6.3.2.38
vec_set	/simnet/src/host/driver.c	2.6.3.2.36
vector_distance_2d	/simnet/libsrc/libquad/vector_2d.c	2.12.1.9.4
vector_is_first	/simnet/libsrc/libquad/water_utilities.c	2.12.1.11.6
vector_normalize_2d	/simnet/libsrc/libquad/vector_2d.c	2.12.1.9.2
vector_rotate_2d	/simnet/libsrc/libquad/vector_2d.c	2.12.1.9.3
vector_z_rotate	/simnet/libsrc/libutil/math.c	2.14.3.5.12
veh_storage.h	/simnet/src/host/veh_storage.h	2.9.1.2
vehicle_bong	/simnet/src/host/pro_sim.c	2.3.1.5



vehicle_bong_do	/simnet/src/host/parser.c	2.5.2.1.26
vehicle_catastrophe	/simnet/src/host/parser.c	2.5.2.1.21
vehicle_component_name	/simnet/libsrc/libdatabase/df_damage.c	2.6.8.6.8
vehicle_deactivate	/simnet/src/host/vehicle.c	2.5.2.2.8
vehicle_defuel	/simnet/src/host/parser.c	2.5.2.1.24
vehicle_facing_point	/simnet/src/host/pilot.c	2.6.4.2.17
vehicle_fake_resupply	/simnet/src/host/parser.c	2.5.2.1.23
vehicle_fill_in_appearance_data	/simnet/src/host/vehicle.c	2.9.2.2.6
vehicle_fill_in_position_data	/simnet/src/host/vehicle.c	2.9.2.2.5
vehicle_impact_to_sbx	/simnet/src/host/sbx.c	2.4.3.2.25
vehicle_iterator_next	/simnet/src/host/iterator.c	2.9.3.1.2
vehicle_iterator_once_next	/simnet/src/host/iterator.c	2.9.3.1.3
vehicle_iterator_reset	/simnet/src/host/iterator.c	2.9.3.1.1
vehicle_kill	/simnet/src/host/pro_sim.c	2.3.1.2
vehicle_kill_remote	/simnet/src/host/pro_sim.c	2.3.1.3
vehicle_list_append	/simnet/src/host/reporter.c	2.8.2.1.18
vehicle_manager_count	/simnet/src/host/iterator.c	2.9.3.1.5
vehicle_manager_count_force	/simnet/src/host/iterator.c	2.9.3.1.6
vehicle_manager_count_hosts	/simnet/src/host/iterator.c	2.9.3.1.8
vehicle_manager_count_sites	/simnet/src/host/iterator.c	2.9.3.1.7
vehicle_manager_print	/simnet/src/host/iterator.c	2.9.3.1.4
vehicle_ping	/simnet/src/host/pro_sim.c	2.3.1.6
vehicle_ping_do	/simnet/src/host/parser.c	2.5.2.1.25
vehicle_planar_distance_squared	/simnet/src/host/vehicle.c	2.9.2.2.7
vehicle_reappeared	/simnet/src/host/reporter.c	2.8.2.1.27
vehicle_resupply	/simnet/src/host/parser.c	2.5.2.1.22
vehicle_show	/simnet/src/host/vehicle.c	2.9.2.2.4
vehicle_status_string	/simnet/src/host/saf_vehicle.c	2.6.1.1.10
vehicle_wall_name	/simnet/libsrc/libdatabase/df_damage.c	2.6.8.6.7
vel2point	/simnet/src/host/driver.c	2.6.3.2.8
wait_until	/simnet/libsrc/libsched/sched.c	2.2.1.5.2
warn_about_point_space	/simnet/libsrc/libquad/terrain.c	2.12.1.1.6
water_check	/simnet/libsrc/libquad/water_check.c	2.12.1.4.4
water_segments_thru	/simnet/libsrc/libquad/water_check.c	2.12.1.4.11
water_thru	/simnet/libsrc/libquad/water_check.c	2.12.1.4.9
waypoint_vel	/simnet/src/host/pilot.c	2.6.4.2.11
weapon_configure	/simnet/src/host/weapons.c	2.6.9.8.4
weapon_deselect	/simnet/src/host/weapons.c	2.6.9.8.15
weapon_load	/simnet/src/host/weapons.c	2.6.9.8.16
weapon_priority_list_show	/simnet/src/host/weapons.c	2.6.9.8.7
weapon_select	/simnet/src/host/weapons.c	2.6.9.8.14
weapon_show	/simnet/src/host/weapons.c	2.6.9.8.6
weapon_state_to_string	/simnet/src/host/weapons.c	2.6.9.8.1
weapon_systems_checkpoint	/simnet/src/host/weapons.c	2.6.9.8.9
weapon_systems_rearm	/simnet/src/host/weapons.c	2.6.9.8.8
weapon_systems_reinit	/simnet/src/host/weapons.c	2.6.9.8.10
weapon_systems_show	/simnet/src/host/weapons.c	2.6.9.8.5
weapon_unload	/simnet/src/host/weapons.c	2.6.9.8.17
weapons.h	/simnet/src/host/weapons.h	2.6.9.9
which_event_ring	/simnet/libsrc/libsched/maint.c	2.2.1.3.6
which_side	/simnet/libsrc/libutil/math.c	2.14.3.5.9
within_delta	/simnet/src/host/misc.c	2.14.1.2.10
write_buffer_all_sbx	/simnet/src/host/sbx.c	2.4.3.2.3
xy_dir_and_range	/simnet/src/host/pilot.c	2.6.4.2.19
yyerror	/simnet/libsrc/libreader/parser.y	2.1.1.1.6
z_velocity	/simnet/src/host/pilot.c	2.6.4.2.13
zero_perf_stats	/simnet/libsrc/libsched/perf.c	2.2.1.4.4

## APPENDIX C

This appendix contains a function called-by tree. The left-hand column is a list of the functions called. The right-hand column is a listing of the calling function(s). The file in which the calling function is defined is listed in parenthesis.

<u>Called Function</u>	<u>Calling Function (filename)</u>
AddSubscription	AssocSubscribeWithMask (subscribe.c)
AppearanceDiscrepancyExceedsThresholds	simnet_send_appearance (SimulationPDU.c)
ApplicationGetSiteHost	AssocReadParams (params.c)
AssocAddToBucket	AssocAddTransaction (origin.c)
	AssocCacheResponse (respondent.c)
AssocAddToEndOfTimeList	AssocAddTransaction (origin.c)
	AssocCacheResponse (respondent.c)
AssocAddTransaction	AssocSendTransact (transact.c)
AssocBucketLookup	AssocFindTransaction (origin.c)
	AssocFindResponse (respondent.c)
AssocCacheResponse	AssocSendResponse (transact.c)
AssocClose	simnet_exit (simnet.c)
AssocCreateFreeList	AssocOpen (open.c)
AssocCreateMCAWithMask	AssocSendTransact (transact.c)
	AssocSendDatagram (send.c)
	AssocSendResponse (transact.c)
	AssocSubscribeWithMask (subscribe.c)
	AssocSendAggregate (aggregate.c)
	AssocUnsubscribeWithMask (subscribe.c)
AssocCurrentlySubscribed	PointToPointReceivePDU (receive.c)
AssocCurrentlySubscribedWithMask	AssocCurrentlySubscribed (subscribe.c)
AssocDeleteCachedResponse	AssocTimeOutOldResponses (respondent.c)
AssocDeleteFromBucket	AssocDeleteCachedResponse (respondent.c)
	AssocDeleteTransaction (origin.c)
AssocDeleteFromTimeList	AssocDeleteCachedResponse (respondent.c)
	AssocDeleteTransaction (origin.c)
AssocDeleteTransaction	AssocProcessResponsePDU (proc_rsp.c)
	UpdateTransactions (tick.c)
AssocError	simnet_tick (simnet.c)
	start_simnet (simnet.c)
AssocFindResponse	AssocProcessRequestPDU (proc_req.c)
AssocFindTransaction	AssocProcessResponsePDU (proc_rsp.c)
AssocFreeDescriptor	AssocDeleteCachedResponse (respondent.c)
	AssocDeleteTransaction (origin.c)
	AssocSendResponse (transact.c)
AssocGetDescriptor	AssocSendTransact (transact.c)
	AssocSendResponse (transact.c)
AssocGetLastAddress	get_sender_of_last_packet (simnet.c)
AssocGetSimAddress	PointToPointOpen (init.c)
AssocGrowFreeList	AssocGetDescriptor (free_list.c)
AssocInitResponses	AssocOpen (open.c)
AssocInitTransactions	AssocOpen (open.c)
AssocMoveToEndOfTimeList	AssocRescheduleTransaction (origin.c)
AssocOpen	PointToPointOpen (init.c)
AssocPadBuffer	AssocSendTransact (transact.c)
	AssocSendDatagram (send.c)
	AssocSendResponse (transact.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
AssocPadBuffer (cont'd)	AssocSendAggregate (aggregate.c)
AssocProcessRequestPDU	AssocReceivePDU (receive.c)
AssocProcessResponsePDU	AssocReceivePDU (receive.c)
AssocReadParams	AssocOpen (open.c)
AssocReceivePDU	PointToPointReceivePDU (receive.c)
AssocRescheduleTransaction	UpdateTransactions (tick.c)
AssocSendAggregate	AssocTickAssocLayer (tick.c)
AssocSendDatagram	ivis_send_contact_report (IvisPDU.c)
	ivis_send_shell_report (IvisPDU.c)
	ivis_send_spot_report (IvisPDU.c)
	PointToPointSendPDU (send.c)
	simnet_send_appearance (SimulationPDU.c)
	simnet_send_collision (SimulationPDU.c)
	simnet_send_deactivate (SimulationPDU.c)
	simnet_send_fire (SimulationPDU.c)
	simnet_send_impact (SimulationPDU.c)
	simnet_send_indirect_fire (SimulationPDU.c)
	simnet_send_radiate (SimulationPDU.c)
	simnet_send_resupply_cancel (SimulationPDU.c)
	simnet_send_resupply_received (SimulationPDU.c)
	simnet_send_resupply_request (SimulationPDU.c)
	simnet_send_status_change (DataCollectionPDU.c)
AssocSendResponse	simnet_tick (simnet.c)
AssocSendTransact	simnet_send_collision (SimulationPDU.c)
	simnet_send_impact (SimulationPDU.c)
AssocSubscribe	start_simnet (simnet.c)
	PointToPointOpen (init.c)
AssocSubscribeWithMask	AssocSubscribe (subscribe.c)
AssocTickAssocLayer	simnet_tick (simnet.c)
AssocTimeOutOldResponses	AssocGetDescriptor (free_list.c)
	AssocTickAssocLayer (tick.c)
AssocUnsubscribeWithMask	AssocClose (close.c)
BeginningOfLine	CopyEarlierCommand (par_hist.c)
ClearLine	ParseInput (par_base.c)
CommandLog	ParseList (par_base.c)
CopyEarlierCommand	PreviousCommand (par_hist.c)
Delete1Backward	DoHelp (par_util.c)
DeleteChar	KillForward (par_edit.c)
DeleteSubscription	AssocUnsubscribeWithMask (subscribe.c)
Do_Hash	get_symbol (symbol.c)
EmptyLine	ParseInput (par_base.c)
EndOfLine	ParseInput (par_base.c)
FieldGet	TypeFields (par_fields.c)
ForwardChar	RightWord (par_edit.c)
Free	CommandLog (par_hist.c)
InitParser	tty_setup_parser_break_set (geyer.c)
InsertChar	CopyEarlierCommand (par_hist.c)
KillForward	CopyEarlierCommand (par_hist.c)
LookForward	GobbleWord (par_edit.c)
MarkCursor	ParseGetToken (par_util.c)
NextChar	ParseEscapeComplete (par_util.c)
ParseConvertNumber	ParseGetDecimal (par_lib.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
ParseError	ParseKeyword (par_base.c)
ParseEscapeComplete	ParseKeyword (par_base.c)
ParseFindEndList	ParseKeyword (par_base.c)
ParseGetToken	ParseList (par_base.c)
ParseInSet	ParseGetToken (par_util.c)
ParseInput	DoEscape (par_util.c)
ParseKeyword	ParseList (par_base.c)
ParseList	ParseKeyword (par_base.c)
ParseMatch	ParseKeyword (par_base.c)
ParseMessage	ParseList (par_base.c)
ParseMustFree	ParseGetString (par_lib.c)
ParsePrint	ForwardChar (par_edit.c)
ParseTableFind	ParseGetFields (par_fields.c)
PointToPointOpen	start_simnet (simnet.c)
PointToPointReceivePDU	simnet_tick (simnet.c)
PointToPointSendPDU	stealth_send_attach_to_vehicle (StealthPDU.c)
	stealth_send_teleport_to (StealthPDU.c)
PrepareDiscrepancyThresholds	create_missile (missile.c)
	create_saf_vehicle (saf_vehicle.c)
RedisplayLine	ParseInput (par_base.c)
RestoreCursor	ParseEscapeComplete (par_util.c)
SAF_NET_SND_KLUDGE	AssocProcessRequestPDU (proc_req.c)
	AssocSendAggregate (aggregate.c)
	AssocSendDatagram (send.c)
	AssocSendResponse (transact.c)
	AssocSendTransact (transact.c)
	UpdateTransactions (tick.c)
ScanBackwards	DeleteWord (par_edit.c)
ScanForward	RightWord (par_edit.c)
SetChannelDefaults	AssocOpen (open.c)
SetStopPoint	DoEscape (par_util.c)
TypeFields	ParseList (par_base.c)
UpdateLine	RedisplayLine (par_edit.c)
	parser_invoke_fcn_on_char (geyer.c)
UpdateMoveCursor	UpdateLine (par_edit.c)
UpdateTransactions	AssocTickAssocLayer (tick.c)
abort	_exit (_exit.s)
	air_tick (flyingveh.c)
	airveh_catastrophic_kill (flyingveh.c)
	bse (breakset.c)
	buffer_allocate (queue_fix.c)
	driver_follow_leader (driver.c)
	driver_follow_vehicle_cmd (driver.c)
	driver_set_leader_mis (driver.c)
	find_new_host_mask (id_hash.c)
	get_args (fncl.c)
	idle_tick (pilot.c)
	init_mappings (map.c)
	init_pilot_state_machine (pilot.c)
	invoke (invoke.c)
	p_follower_followroute_tick (p_follower.c)
	p_follower_hoverhold_tick (p_follower.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
abort (cont.)	p_follower_landhold_tick (p_follower.c) pilot_follow_leader (pilot.c) pilot_follow_leader_tick (p_follower.c) pilot_followroute_tick (pilot.c) pilot_goto_point_im (pilot.c) pilot_hold (pilot.c) pilot_hoverattack_tick (pilot.c) pilot_hoverhold_tick (pilot.c) pilot_init_followroute (pilot.c) pilot_landhold_tick (pilot.c) pilot_landing (pilot.c) pilot_orbit_tick (pilot.c) pilot_orbithold (pilot.c) pilot_set_leader_mis (pilot.c) pilot_start_landed (pilot.c) pilot_start_landing (pilot.c) pilot_start_takingoff (pilot.c) pilot_tick2 (pilot.c) remove_function (maint.c) saf_vehicle_set_speed (saf_vehicle.c) simple_queue_allocate (bufpool.c) which_event_ring (maint.c) next_road_point (roads.c) _seterr_reply (rpc_prot.c) fgetpwent (ht_getpwent.c) tzload (ctime.c) net_access (net_acce.c) net_access (net_acce.c) interior_angle_between_vectors (math.c) missile_show (missile.c) gunner_tick (gunner.c) check_predicates (predicates.c) navigator_entered_area (navigator.c) navigator_entered_zone (navigator.c) navigator_passed_line (navigator.c) cm_execute_overlay (cm.c) navigator_passed_point (navigator.c) cm_execute_overlay (cm.c) spotter_sum_inferior_composite_tables (spotter.c) sort_trim_hits (pve_checkvis.c) remove_clustered_vehicle (reporter.c) cluster_shell (reporter.c) cluster_vehicle (reporter.c) composite_generate_status_report (composite.c) saf_vehicle_generate_status_report (saf_vehicle.c) dbm_store (ndbm.c) yp_getgrent (yp_getgrent.c) yp_getpwent (yp_getpwent.c) push_cis (cis.c) pop_cis (cis.c) pop_resumable_cis (cis.c) check_predicates (predicates.c)
abs	
accepted	
access	
access_147	
access_cmc	
acos	
acquire_target	
action_drill_needed	
activate_new_cis	
add_executing_unit	
add_into_spotter_table	
add_last_hit	
add_removed_vehicle	
add_shelling_to_cluster	
add_vehicle_to_cluster	
add_weapons_status	
additem	
addtominuslist	
addtominuslist	
adjust_behaviors	
air_raid_happening	

<u>Called Function</u>	<u>Calling Function (filename)</u>
air_raid_over	check_predicates (predicates.c)
air_tick	saf_vehicle_tick (saf_vehicle.c)
airveh_catastrophic_kill	saf_vehicle_catastrophic_kill (saf_vehicle.c)
airveh_init	create_airveh (flyingveh.c)
airveh_show	saf_vehicle_show (saf_vehicle.c)
alarm	syslog (syslog.c)
allocate_bitfield	create_reporter (reporter.c)
	allocate_spotter_tables (spotter.c)
	sbx_connection_init (sbx.c)
	sbx_connection_init (sbx.c)
allocate_points	create_bridges (bridges.c)
	create_buildings (trees.c)
	create_contours (trees.c)
	create_lakes (bridges.c)
	create_rivers (rivers.c)
	create_roads (roads.c)
	create_trees (trees.c)
allocate_safobj	create_remote (remote.c)
	create_composite (composite.c)
allocate_spotter_tables	create_saf_vehicle (saf_vehicle.c)
ammo_to_shell_type	create_spotter (spotter.c)
angle_between_vectors	cluster_shell (reporter.c)
angle_clip	groundveh_move (groundveh.c)
	turret_point_at_target (turret.c)
	turret_scan (turret.c)
	turret_slew (turret.c)
	vehicle_fill_in_position_data (vehicle.c)
any	_gethtent (ht_getnamadr.c)
	_host_interpret (ht_gethent.c)
	ht_getnetent (ht_gnetent.c)
	ht_getprotoent (ht_getpent.c)
	ht_getservent (ht_gservent.c)
	interpret (ht_grpcent.c)
	interpret (yp_gethostent.c)
	interpret (yp_getpent.c)
	interpret (yp_getservent.c)
	interpret (yp_gnetent.c)
append_routepoint	expand_road_route (route.c)
	generate_in_place_route (route.c)
	generate_route_from_route_msg (route.c)
are_we_there	idle_tick (pilot.c)
arty_type_string	sbx_connection_generate_arty_msg (sbx.c)
asctime	ctime (ctime.c)
asin	turret_point_at_target (turret.c)
	helo_tick (helo.c)
atan	missile_show (missile.c)
atan2	create_new_cluster (reporter.c)
	create_saf_vehicle (saf_vehicle.c)
	entity_fill_in_position_data (entity.c)
	groundveh_move (groundveh.c)
	helo_tick (helo.c)
	pilot_start_landed (pilot.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
atan2 (cont'd)	remote_tick (remote.c) saf_vehicle_teleport (saf_vehicle.c) turret_point_at_target (turret.c) update_cluster_heading (reporter.c) vehicle_fill_in_position_data (vehicle.c)
atof	yylex (lexer.c) _innum (doscan.c)
toi	interpret (yp_getrpcnt.c)
attackatwill_tick	pilot_tick (pilot.c)
auth_errmsg	clnt_sperror (clnt_perror.c)
authnone_create	clntudp_bufcreate (clnt_udp.c)
average	sort_trim_hits (pve_checkvis.c)
bcmp	yp_match (yp_match.c)
bcopy	AssocPadBuffer (send.c) AssocSendAggregate (aggregate.c) AssocSendDatagram (send.c) AssocSendResponse (transact.c) AssocSendTransact (transact.c) buf_rudp_write_message (buf_conn.c) commander_note_leader_state (commander.c) commander_restore_leader_state (commander.c) composite_fill_in_appearance_data (composite.c) composite_get_composite_bumpers (composite.c) copy_bitfield (bitfield.c) dns_gethostbyaddr (dns_getnamadr.c) do_mode_cmd_cmc (net_mode.c) fill_ivis_report_tags (IvisPDU.c) get_args (fncl.c) get_control_measure (cm.c) get_overlay (cm.c) getanswer (dns_getnamadr.c) interesting_packet_test (simnet.c) ivis_send_contact_report (IvisPDU.c) ivis_send_shell_report (IvisPDU.c) ivis_send_spot_report (IvisPDU.c) net_get_parameters (net_open.c) net_get_rcv (net_rcv.c) next_road_point (roads.c) open_cmc (net_open.c) PointToPointSendPDU (send.c) remote_tick (remote.c) res_mkquery (res_mkquery.c) res_querydomain (res_query.c) rudp_post_message (rel_conn.c) SAF_NET_SND_KLUDGE (simnet.c) sbx_connection_reset_msg (sbx.c) send_cmc (net_osem.c) send_cmc_8023 (net_send.c) send_contact_report (reporter.c) send_shelling_report (reporter.c) send_spot_report (reporter.c) simnet_send_appearance (SimulationPDU.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
bcopy (cont.)	simnet_send_resupply_received (SimulationPDU.c) simnet_send_resupply_request (SimulationPDU.c) simnet_tick (simnet.c) vehicle_fill_in_appearance_data (vehicle.c) xdrmem_getbytes (xdr_mem.c) xdrmem_getlong (xdr_mem.c) xdrmem_putbytes (xdr_mem.c) xdrmem_putlong (xdr_mem.c)
binarysearch_tag	find_tag_sorted (tags.c)
bind	udp_open (udp_berkeley.c) bindresvport (bindresvport.c)
bindresvport	clntudp_bufcreate (clnt_udp.c)
broadcast_appearance_data	saf_vehicle_catastrophic_kill (saf_vehicle.c) saf_vehicle_mobility_kill (saf_vehicle.c)
broadcast_pae_data	remote_tick (remote.c) saf_vehicle_firepower_kill (saf_vehicle.c) remote_tick (remote.c)
broadcast_veh_is_gone	unit_send_pae_data (composite.c)
bse	remote_deactivate (remote.c) print_break_set (breakset.c) tty_invoke_fcn_on_char (breakset.c) map_key (breakset.c) parser_invoke_fcn_on_char (geyer.c)
buf_rudp_close	sbx_connection_exit (sbx.c)
buf_rudp_discard_all_buffers	buf_rudp_disconnect (buf_conn.c) sbx_connection_reset_msg (sbx.c) buf_rudp_read_message (buf_conn.c) sbx_connection_disconnect (sbx.c) buf_rudp_write_message (buf_conn.c) buf_rudp_tick (buf_conn.c) sbx_connection_reset_msg (sbx.c) sbx_connection_wat_pulse (sbx.c)
buf_rudp_disconnect	sbx_connection_init (sbx.c)
buf_rudp_flush	sbx_connection_open (sbx.c) sbx_connection_tick (sbx.c) sbx_connection_show (sbx.c) sbx_connection_wat_pulse (sbx.c) sbx_connection_reset_msg (sbx.c) sbx_connection_tick (sbx.c)
buf_rudp_init	buf_rudp_tick (buf_conn.c)
buf_rudp_open	buffer_deallocate (queue_fix.c)
buf_rudp_read_message	activate_new_cis (cis.c)
buf_rudp_show	broadcast_appearance_data (sbx.c)
buf_rudp_tick	broadcast_pae_data (sbx.c)
buf_rudp_write_message	broadcast_veh_is_gone (sbx.c)
buffer_deallocate	buffer_allocate_into_pool (bufpool.c)
buffer_allocate	change_movement_and_report (cis.c) composite_generate_status_report (composite.c) create_missile (missile.c) create_saf_vehicle (saf_vehicle.c) gasp (main.c) ivis_send_contact_report (IvisPDU.c)



<u>Called Function</u>	<u>Calling Function (filename)</u>
buffer_allocate (cont.)	ivis_send_spot_report (IvisPDU.c) queue_allocate (queue_fix.c) remote_tick (remote.c) rudp_post_message (rel_conn.c) saf_vehicle_checkpoint_state (saf_vehicle.c) saf_vehicle_generate_status_report (saf_vehicle.c) sbx_connection_process_ground_impact (sbx.c) sbx_connection_process_indirect_fire (sbx.c) sbx_connection_process_vehicle_impact (sbx.c) sbx_connection_reset_msg (sbx.c) sbx_connection_stat_pulse (sbx.c) sbx_connection_synch_received (sbx.c) sbx_connection_wat_pulse (sbx.c) sbx_printf (sbx.c) send_contact_report (reporter.c) send_shelling_report (reporter.c) send_spot_report (reporter.c) send_stealth_gone_msg (remote.c) simnet_send_appearance (SimulationPDU.c) simnet_send_collision (SimulationPDU.c) simnet_send_deactivate (SimulationPDU.c) simnet_send_fire (SimulationPDU.c) simnet_send_impact (SimulationPDU.c) simnet_send_indirect_fire (SimulationPDU.c) simnet_send_radiate (SimulationPDU.c) simnet_send_resupply_cancel (SimulationPDU.c) simnet_send_resupply_received (SimulationPDU.c) simnet_send_resupply_request (SimulationPDU.c) simnet_send_status_change (DataCollectionPDU.c) simnet_tick (simnet.c) stealth_send_attach_to_vehicle (StealthPDU.c) stealth_send_teleport_to (StealthPDU.c) simnet_tick (simnet.c)
buffer_allocate_from_pool	buffer_pool_allocate (bufpool.c)
buffer_allocate_into_pool	activate_new_cis (cis.c)
buffer_deallocate	broadcast_appearance_data (sbx.c) broadcast_pae_data (sbx.c) broadcast_veh_is_gone (sbx.c) buf_rudp_tick (buf_conn.c) buffer_simple_flush (bufpool.c) change_movement_and_report (cis.c) composite_generate_status_report (composite.c) composite_tick (composite.c) destroy_logistics (logistics.c) destroy_missile (missile.c) gasp (main.c) ivis_send_contact_report (IvisPDU.c) ivis_send_shell_report (IvisPDU.c) ivis_send_spot_report (IvisPDU.c) remote_deactivate (remote.c) remote_go_away (remote.c) remote_new_appearance (remote.c)

**Called Function**

buffer\_deallocate (cont'd)

**Calling Function (filename)**

	remote_tick (remote.c)
	rudp_ack_received (rel_conn.c)
	rudp_post_message (rel_conn.c)
	saf_vehicle_checkpoint_state (saf_vehicle.c)
	saf_vehicle_generate_status_report (saf_vehicle.c)
	saf_vehicle_go_away (saf_vehicle.c)
	saf_vehicle_tick (saf_vehicle.c)
	sbx_connection_process_ground_impact (sbx.c)
	sbx_connection_process_indirect_fire (sbx.c)
	sbx_connection_process_vehicle_impact (sbx.c)
	sbx_connection_stat_pulse (sbx.c)
	sbx_connection_synch_received (sbx.c)
	sbx_connection_wat_pulse (sbx.c)
	sbx_printf (sbx.c)
	send_contact_report (reporter.c)
	send_shelling_report (reporter.c)
	send_spot_report (reporter.c)
	send_stealth_gone_msg (remote.c)
	simnet_send_appearance (SimulationPDU.c)
	simnet_send_collision (SimulationPDU.c)
	simnet_send_deactivate (SimulationPDU.c)
	simnet_send_fire (SimulationPDU.c)
	simnet_send_impact (SimulationPDU.c)
	simnet_send_indirect_fire (SimulationPDU.c)
	simnet_send_radiate (SimulationPDU.c)
	simnet_send_resupply_cancel (SimulationPDU.c)
	simnet_send_resupply_received (SimulationPDU.c)
	simnet_send_resupply_request (SimulationPDU.c)
	simnet_send_status_change (DataCollectionPDU.c)
	simnet_tick (simnet.c)
	stealth_send_attach_to_vehicle (StealthPDU.c)
	stealth_send_teleport_to (StealthPDU.c)
buffer_dequeue	buf_rudp_tick (buf_conn.c)
	rudp_ack_received (rel_conn.c)
buffer_enqueue	sbx_connection_write_buffer (sbx.c)
	rudp_post_message (rel_conn.c)
buffer_flush	rudp_discard_all_buffers (rel_conn.c)
	buf_rudp_discard_all_buffers (buf_conn.c)
buffer_length	rudp_retransmit_buf (rel_conn.c)
	buf_rudp_tick (buf_conn.c)
buffer_one_less	buffer_deallocate (queue_fix.c)
	buffer_allocate_into_pool (bufpool.c)
buffer_one_more	buffer_allocate (queue_fix.c)
	buffer_allocate_from_pool (bufpool.c)
buffer_pool_allocate	start_simnet (simnet.c)
buffer_pool_return_buffer	buffer_deallocate (queue_fix.c)
	buffer_allocate_into_pool (bufpool.c)
buffer_simple_dequeue	buffer_simple_flush (bufpool.c)
	composite_tick (composite.c)
	remote_tick (remote.c)
	saf_vehicle_tick (saf_vehicle.c)
buffer_simple_enqueue	enqueue_on_rcvq (simnet.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
buffer_simple_enqueue (cont'd)	protocol_sim_process (simnet.c)
buffer_simple_flush	remote_tick (remote.c)
	destroy_entity (entity.c)
buffer_statistics_init	buffer_one_less (queue_fix.c)
	buffer_one_more (queue_fix.c)
	buffer_statistics_print (queue_fix.c)
buffer_traverse_and_apply	rudp_ack_received (rel_conn.c)
buffer_traverse_and_apply_n_times	rudp_retransmit (rel_conn.c)
buffer_up_refcnt	remote_new_appearance (remote.c)
buildings_thru	detect_building_on_path_tick (collision.c)
bzero	allocate_bitfield (bitfield.c)
	allocate_safobj (safobj.c)
	bindresvport (bindresvport.c)
	broadcast_appearance_data (sbx.c)
	broadcast_pae_data (sbx.c)
	calloc (calloc.c)
	clear_bitfield (bitfield.c)
	clntudp_call (clnt_udp.c)
	count_hosts (parser.c)
	count_sites (parser.c)
	create_composite (composite.c)
	create_missile (missile.c)
	create_saf_vehicle (saf_vehicle.c)
	create_vehicle (vehicle.c)
	do_mode_cmd_cmc (net_mode.c)
	find_new_host_mask (id_hash.c)
	get_formation_layout (formation.c)
	get_symbol (symbol.c)
	init_grid_tables (iterator.c)
	init_saf_to_simnet_id_table (id_hash.c)
	init_safobj_table (safobj.c)
	init_symbol_table (symbol.c)
	map_buffers (net_stuf.c)
	open_cmc (net_open.c)
	open_io_connections (sbx.c)
	parse_servfile (vis.c)
	res_send (res_send.c)
	saf_vehicle_checkpoint_state (saf_vehicle.c)
	sbx_connection_stat_pulse (sbx.c)
	simnet_send_fire (SimulationPDU.c)
	weapon_configure (weapons.c)
	zero_perf_stats (perf.c)
cache_and_file_terminate	exit_handler (main.c)
cache_init	tdb_init_cache (tdb_init.c)
cachectl	map_buffers (net_stuf.c)
calloc	_findiop (findiop.c)
	_f_morefiles (findiop.c)
	f_prealloc (findiop.c)
	heap_calloc (alloc.c)
cancel_fncl	sbx_connection_disconnect (sbx.c)
	stop_ticking (tickable.c)
	sbx_connection_reset_msg (sbx.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
cancel_fncl (cont'd)	cancel_fncl_group (fncl.c)
cancel_fncl_group	composite_go_away (composite.c)
	remote_go_away (remote.c)
	saf_vehicle_go_away (saf_vehicle.c)
canopies	patch (pve_checkvis.c)
center_column	minimum_clip (minimum_clip.c)
change_fncl_period	change_tick_rate (tickable.c)
change_movement_and_report	adjust_behaviors (cis.c)
change_tick_rate	remote_start_being_watched (remote.c)
change_tick_rate (cont'd)	saf_vehicle_tick (saf_vehicle.c)
	remote_tick (remote.c)
	remote_stop_being_watched (remote.c)
check_binder_up	_yp_dobind (yp_bind.c)
check_binding	_yp_dobind (yp_bind.c)
check_box	treelines (pve_checkvis.c)
	canopies (pve_checkvis.c)
	objects (pve_checkvis.c)
check_edge_hit	check_edges (pve_checkvis.c)
heck_edges	canopies (pve_checkvis.c)
	terrain (pve_checkvis.c)
check_hits	patch (pve_checkvis.c)
check_object	objects (pve_checkvis.c)
check_pmap_up	get_binder_port (yp_bind.c)
check_predicates	commander_tick (commander.c)
check_prob	get_i_and_t_from_normal (impact.c)
	fire_weapon_at_target (weapons.c)
	target_type_ok (targeting.c)
check_tree_hit	treelines (pve_checkvis.c)
	trees (pve_checkvis.c)
choose_resupply_item	logistics_tick (logistics.c)
choose_skirt_point	start_avoiding_house (collision.c)
choose_target_and_weapon	targeting_tick (targeting.c)
is_show	composite_show (composite.c)
cleanup	ht_fgetgrent (ht_getgrent.c)
clear_bit	reporter_remove_vehicles (reporter.c)
	spotter_remove_vehicles (spotter.c)
clear_bitfield	create_reporter (reporter.c)
	sbx_connection_init (sbx.c)
	sbx_set_specific_known_vehicles (sbx.c)
	sbx_set_top_level_known_vehicles (sbx.c)
	spotter_init_table (spotter.c)
clear_cis_stack	cm_execute_overlay (cm.c)
clear_detection	create_detection (detection.c)
clear_monitor_variables	print_reasons_and_clear (parser.c)
clear_weapons_status	composite_generate_status_report (composite.c)
	saf_vehicle_generate_status_report (saf_vehicle.c)
clip_angle_positive	turret_slew (turret.c)
	stealth_send_teleport_to (StealthPDU.c)
clip_to_tdb	startup (pve_checkvis.c)
clnt_spcreateerror	clnt_pcreateerror (clnt_perror.c)
lnt_spermo	clnt_permo (clnt_perror.c)
	clnt_spccreateerror (clnt_perror.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
lnt_sperrno (cont'd)	clnt_sperror (clnt_perror.c)
clnt_sperror	clnt_perror (clnt_perror.c)
clntudp_bufcreate	talk2_binder (yp_bind.c)
	pmap_getport (pmap_getport.c)
	clntudp_create (clnt_udp.c)
close	_res_close (res_send.c)
	cache_and_file_terminate (cache_alloc.c)
	clntudp_destroy (clnt_udp.c)
	closelog (syslog.c)
	fclose (flsbuf.c)
close (cont'd)	get_type (net_open.c)
	open_cmc (net_open.c)
	pmap_getport (pmap_getport.c)
	read_quadtree (terrain.c)
	res_send (res_send.c)
	syslog (syslog.c)
	tdb_get_db_format (version.c)
	tzload (ctime.c)
	udp_close (udp_berkeley.c)
closest_leader	compute_who_follows_whom (formation.c)
closest_to_a_leader	compute_who_follows_whom (formation.c)
cluster_from_vehicle	action_drill_needed (predicates.c)
	hasty_attack_needed (predicates.c)
cluster_shell	composite_indirect_fire (composite.c)
cluster_vehicle	update_reporter_vehicles (reporter.c)
	update_clusters (reporter.c)
cm_add_area	sbx_add_area (sbx.c)
cm_add_line	sbx_add_line (sbx.c)
cm_add_point	sbx_add_point (sbx.c)
cm_add_route	sbx_add_route (sbx.c)
cm_add_zone	sbx_add_zone (sbx.c)
cm_applies_to_unit	cm_recompute_cm_from_overlay (cm.c)
	cm_get_cm_from_overlay (cm.c)
cm_count_intersections	cm_point_inside_polygon (navigator.c)
cm_delete_cm	sbx_delete_cm (sbx.c)
cm_delete_cm_from_overlay	cm_delete_cm (cm.c)
	cm_delete_overlay (cm.c)
cm_delete_overlay	sbx_delete_overlay (sbx.c)
	sbx_connection_reset_msg (sbx.c)
cm_execute_overlay	sbx_execute_overlay (sbx.c)
cm_find_cm	cm_execute_overlay (cm.c)
cm_find_cm_list_item	cm_delete_cm_from_overlay (cm.c)
	cm_find_cm (cm.c)
cm_find_overlay	cm_delete_cm (cm.c)
	cm_execute_overlay (cm.c)
cm_find_overlay_list_item	cm_find_overlay (cm.c)
	cm_delete_overlay (cm.c)
cm_force_overlay_recalculation	cm_add_line (cm.c)
	cm_delete_cm (cm.c)
	cm_add_zone (cm.c)
	cm_add_point (cm.c)
	cm_add_area (cm.c)

**Called Function**

cm\_get\_center\_of\_mass  
 cm\_get\_cm\_from\_overlay  
 cm\_intersection  
 cm\_point\_inside\_polygon  
 cm\_point\_line\_intersection  
 cm\_poly\_intersection  
 cm\_recompute\_cm\_from\_overlay  
 cm\_to\_passage\_string  
 collect\_perf\_stat  
 collision\_dead\_tick  
 collision\_disengaging  
 collision\_remove\_vehicles  
 collision\_show  
 collision\_tick  
 collision\_vehicle\_rammed  
 combined\_velocity

commander\_attack  
 commander\_cancel\_overlay  
 commander\_change\_altitude  
 commander\_change\_formation  
 commander\_change\_speed  
 commander\_execute\_overlay  
 commander\_executing\_order  
 commander\_face\_direction  
 commander\_follow\_vehicle  
 commander\_get\_mission\_status  
 commander\_goto\_point

commander\_halt

commander\_inferior\_changed\_status  
 commander\_land  
 commander\_note\_leader\_state

commander\_restore\_leader\_state

commander\_resume\_mission  
 commander\_set\_mission\_direction  
 commander\_set\_mission\_formation  
 commander\_set\_mission\_speed  
 commander\_show  
 commander\_simulator\_in\_command  
 commander\_state\_string  
 commander\_tick  
 composite\_add\_inferior\_composite  
 composite\_add\_inferior\_vehicle

**Calling Function (filename)**

change\_movement\_and\_report (cis.c)  
 navigator\_set\_overlay (navigator.c)  
 navigator\_tick (navigator.c)  
 navigator\_tick (navigator.c)  
 navigator\_tick (navigator.c)  
 navigator\_tick (navigator.c)  
 navigator\_reset\_overlay (navigator.c)  
 fill\_generic\_cis\_report (cis.c)  
 invoke\_functions\_until (sched.c)  
 saf\_vehicle\_tick (saf\_vehicle.c)  
 saf\_vehicle\_doing\_collision\_stuff (saf\_vehicle.c)  
 saf\_vehicle\_remove\_vehicles (saf\_vehicle.c)  
 saf\_vehicle\_show (saf\_vehicle.c)  
 saf\_vehicle\_tick (saf\_vehicle.c)  
 saf\_vehicle\_vehicle\_rammed (saf\_vehicle.c)  
 p\_follower\_hoverhold (p\_follower.c)  
 p\_follower\_hoverhold\_tick (p\_follower.c)  
 p\_follower\_landhold\_tick (p\_follower.c)  
 p\_follower\_set\_desired\_vel (p\_follower.c)  
 pilot\_goto\_endpoint (pilot.c)  
 pilot\_gotopoint (pilot.c)  
 pilot\_orbithold (pilot.c)  
 composite\_attack (composite.c)  
 composite\_cancel\_overlay (composite.c)  
 composite\_change\_altitude (composite.c)  
 composite\_change\_formation (composite.c)  
 composite\_change\_speed (composite.c)  
 composite\_execute\_overlay (composite.c)  
 composite\_executing\_order (composite.c)  
 composite\_face\_direction (composite.c)  
 composite\_follow\_vehicle (composite.c)  
 composite\_generate\_status\_report (composite.c)  
 change\_movement\_and\_report (cis.c)  
 composite\_goto\_point (composite.c)  
 change\_movement\_and\_report (cis.c)  
 composite\_halt (composite.c)  
 composite\_inferior\_changed\_status (composite.c)  
 composite\_land (composite.c)  
 composite\_note\_leader\_state (composite.c)  
 composite\_assume\_formation (composite.c)  
 composite\_reassign\_current\_formation (composite.c)  
 composite\_assume\_formation (composite.c)  
 composite\_resume\_mission (composite.c)  
 change\_movement\_and\_report (cis.c)  
 adjust\_behaviors (cis.c)  
 adjust\_behaviors (cis.c)  
 composite\_show (composite.c)  
 composite\_simulator\_in\_command (composite.c)  
 commander\_show (commander.c)  
 composite\_tick (composite.c)  
 composite\_set\_superior (composite.c)  
 saf\_vehicle\_set\_superior (saf\_vehicle.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
composite_add_member_vehicle	composite_add_member_vehicle (composite.c)
composite_assume_formation	composite_add_inferior_vehicle (composite.c) commander_set_mission_formation (commander.c) commander_resume_mission (commander.c) create_unit (create.c)
composite_assume_formation_internal	commander_change_formation (commander.c) composite_reassign_current_formation (composite.c) composite_assume_formation (composite.c)
composite_attack	sbx_attack (sbx.c)
composite_cancel_overlay	composite_rejoin_unit (composite.c)
composite_change_altitude	sbx_altitude (sbx.c)
composite_change_formation	sbx_change_formation (sbx.c)
composite_change_speed	sbx_change_speed (sbx.c)
composite_check_unit_strength	composite_tick (composite.c)
composite_distinguished_member	enemy_disposition (predicates.c) composite_tick (composite.c)
composite_execute_overlay	execute_overlay (dispatch.c)
composite_executing_order	saf_vehicle_useless (saf_vehicle.c)
composite_face_direction	sbx_face_direction (sbx.c)
composite_fake_resupply	fake_resupply (dispatch.c)
composite_fill_in_appearance_data	fill_in_appearance_data (dispatch.c)
composite_fill_in_echelon_data	fill_in_echelon_data (dispatch.c)
composite_fill_in_position_data	fill_in_position_data (dispatch.c)
composite_find_living_vehicle	composite_distinguished_member (composite.c)
composite_find_vehicle_for_stealth	composite_find_vehicle_for_stealth (composite.c)
composite_follow_vehicle	sbx_attach_stealth (sbx.c)
composite_generate_status_report	sbx_follow_vehicle (sbx.c)
composite_get_composite_bumpers	generate_status_report (dispatch.c) composite_get_composite_bumpers (composite.c) create_unit (create.c)
composite_go_away	go_away (dispatch.c)
composite_goto_point	sbx_goto_point (sbx.c)
composite_halt	collision_tick (collision.c) sbx_hold (sbx.c) sbx_halt (sbx.c)
composite_indirect_fire	composite_pro_sim (composite.c)
composite_inferior_changed_status	commander_attack (commander.c) commander_cancel_overlay (commander.c) commander_change_formation (commander.c) commander_execute_overlay (commander.c) commander_face_direction (commander.c) commander_follow_vehicle (commander.c) commander_goto_point (commander.c) commander_halt (commander.c) commander_inferior_changed_status (commander.c) commander_land (commander.c) commander_resume_mission (commander.c) commander_set_mission_formation (commander.c) commander_simulator_in_command (commander.c) groundveh_tick (groundveh.c) saf_vehicle_cancel_overlay (saf_vehicle.c) saf_vehicle_catastrophic_kill (saf_vehicle.c)

**Called Function****Calling Function (filename)**

composite_inferior_changed_status (cont.)	saf_vehicle_execute_overlay (saf_vehicle.c) saf_vehicle_face_direction (saf_vehicle.c) saf_vehicle_fake_resupply (saf_vehicle.c) saf_vehicle_follow_vehicle (saf_vehicle.c) saf_vehicle_goto_point (saf_vehicle.c) saf_vehicle_halt (saf_vehicle.c) saf_vehicle_mobility_kill (saf_vehicle.c) saf_vehicle_out_of_gas (saf_vehicle.c) saf_vehicle_resume_mission (saf_vehicle.c)
composite_land	sbx_land (sbx.c)
composite_note_leader_state	commander_attack (commander.c) commander_cancel_overlay (commander.c) commander_change_formation (commander.c) commander_execute_overlay (commander.c) commander_face_direction (commander.c) commander_follow_vehicle (commander.c) commander_goto_point (commander.c) commander_halt (commander.c) commander_land (commander.c) commander_note_leader_state (commander.c) commander_resume_mission (commander.c) commander_set_mission_formation (commander.c) commander_simulator_in_command (commander.c)
composite_note_leader_state (cont'd)	get_a_leader (commander.c) groundveh_tick (groundveh.c) saf_vehicle_cancel_overlay (saf_vehicle.c) saf_vehicle_catastrophic_kill (saf_vehicle.c) saf_vehicle_execute_overlay (saf_vehicle.c) saf_vehicle_face_direction (saf_vehicle.c) saf_vehicle_fake_resupply (saf_vehicle.c) saf_vehicle_follow_vehicle (saf_vehicle.c) saf_vehicle_goto_point (saf_vehicle.c) saf_vehicle_halt (saf_vehicle.c) saf_vehicle_mobility_kill (saf_vehicle.c) saf_vehicle_out_of_gas (saf_vehicle.c) saf_vehicle_resume_mission (saf_vehicle.c) saf_vehicle_catastrophic_kill (saf_vehicle.c)
composite_note_member_vehicle_has_died	composite_tick (composite.c)
composite_pro_sim	readjust_overlay (dispatch.c)
composite_readjust_overlay	get_a_leader (commander.c)
composite_reassign_current_formation	commander_inferior_changed_status (commander.c)
composite_rejoin_unit	sbx_rejoin_unit (sbx.c)
composite_remove_inferior_composite	composite_set_superior (composite.c)
composite_remove_inferior_vehicle	saf_vehicle_set_superior (saf_vehicle.c)
composite_remove_member_vehicle	composite_remove_inferior_composite (composite.c) composite_remove_inferior_vehicle (composite.c)
composite_remove_vehicles	remove_vehicles (dispatch.c)
composite_resume_mission	sbx_resume_mission (sbx.c)
composite_send_unit_strength_message	composite_check_unit_strength (composite.c)
composite_set_recursive_ids	composite_set_recursive_ids (composite.c) composite_set_sbx_ids (composite.c)
composite_set_sbx_ids	create_unit (create.c)



<u>Called Function</u>	<u>Calling Function (filename)</u>
composite_set_superior	create_unit (create.c)
composite_set_targeting_parameters	set_targeting_parameters (dispatch.c)
composite_show	show (dispatch.c)
composite_simulator_in_command	sbx_simulator_in_command (sbx.c)
composite_start_ticking	create_unit (create.c)
composite_teleport_to_station	create_unit (create.c)
compute_damage_keys	database_df_damage_query (df_damage.c)
compute_enemy_weight	detection_tick (detection.c)
compute_explosion_point	missile_maybe_hit_target (missile.c)
compute_interest_direction	detection_tick (detection.c)
compute_mid	treelines (pve_checkvis.c)
compute_situation	pilot_start_gotopoint (pilot.c)
	pilot_goto_endpoint (pilot.c)
	pilot_gotopoint (pilot.c)
compute_who_follows_whom	get_formation_layout (formation.c)
connect	openlog (syslog.c)
	res_send (res_send.c)
cons	push (list.c)
copy_bitfield	update_reporter_vehicles (reporter.c)
copy_float_point_list_to_real_point_list	cm_add_line (cm.c)
	cm_add_zone (cm.c)
	cm_add_area (cm.c)
copy_matrix_row_to_vector	plane_tick (plane.c)
	helo_tick (helo.c)
	remote_tick (remote.c)
	groundveh_move (groundveh.c)
copy_stack_to_array	copy_stack_to_array (parser.y)
	make_array (parser.y)
copy_xy_on_tdb	z_velocity (pilot.c)
	ground_level (pilot.c)
cos	create_entity (entity.c)
	create_missile (missile.c)
	driver_face_direction_cmd (driver.c)
	helo_tick (helo.c)
	hull_to_world_from_orientation (flyingveh.c)
	mat_rot_init (mat_r_init.c)
	pilot_face_direction (pilot.c)
	plane_tick (plane.c)
	PrepareDiscrepancyThresholds (thresh.c)
	turret_muzzle_position_in_world_coordinates (turret.c)
	turret_set_scan_parms (turret.c)
count_intersections	point_inside_polygon (intersection.c)
countries_from_battle_scheme_and_force	parser_create_vehicle (parser.c)
country_to_string	sbx_connection_create_unit_msg (sbx.c)
create_airveh	create_saf_vehicle (saf_vehicle.c)
create_bridges	read_terrain_files (terrain.c)
create_buildings	read_terrain_files (terrain.c)
create_cis	activate_new_cis (cis.c)
	check_predicates (predicates.c)
create_collision	create_saf_vehicle (saf_vehicle.c)
create_commander	create_composite (composite.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
create_composite	create_unit (create.c)
create_contours	read_terrain_files (terrain.c)
create_damage	create_saf_vehicle (saf_vehicle.c)
create_detection	create_saf_vehicle (saf_vehicle.c)
create_driver	create_saf_vehicle (saf_vehicle.c)
create_entity	create_remote (remote.c)
	create_composite (composite.c)
	create_saf_vehicle (saf_vehicle.c)
create_groundveh	create_saf_vehicle (saf_vehicle.c)
create_lakes	read_terrain_files (terrain.c)
create_logistics	create_saf_vehicle (saf_vehicle.c)
create_missile	weapon_configure (weapons.c)
create_navigator	create_composite (composite.c)
create_new_cluster	cluster_vehicle (reporter.c)
create_new_shelling	cluster_shell (reporter.c)
create_pilot	create_saf_vehicle (saf_vehicle.c)
create_predicates	create_composite (composite.c)
create_remote	create_remote_vehicle (remote.c)
create_remote_vehicle	protocol_sim_process (simnet.c)
	protocol_stealth_process (simnet.c)
create_reporter	create_composite (composite.c)
create_river_ints	read_terrain_files (terrain.c)
create_rivers	read_terrain_files (terrain.c)
create_road_ints	read_terrain_files (terrain.c)
create_roads	read_terrain_files (terrain.c)
create_routepoint	expand_road_route (route.c)
	generate_in_place_route (route.c)
	generate_route_from_route_msg (route.c)
create_saf_vehicle	create_unit (create.c)
create_spotter	create_composite (composite.c)
create_targeting	create_saf_vehicle (saf_vehicle.c)
create_tickable	create_remote (remote.c)
	create_composite (composite.c)
	create_saf_vehicle (saf_vehicle.c)
create_tree_canopies	read_terrain_files (terrain.c)
create_trees	read_terrain_files (terrain.c)
create_turret	create_saf_vehicle (saf_vehicle.c)
create_unit	sbx_connection_create_unit_msg (sbx.c)
	parser_create_vehicle (parser.c)
create_vehicle	create_remote (remote.c)
	create_saf_vehicle (saf_vehicle.c)
create_weapon_systems	create_saf_vehicle (saf_vehicle.c)
ctime	syslog (syslog.c)
cvt	_doprnt (doprnt.c)
damage_indirect_fire	saf_vehicle_indirect_fire (saf_vehicle.c)
damage_string	damage_indirect_fire (damage.c)
	damage_vehicle_impact (damage.c)
damage_vehicle_impact	saf_vehicle_vehicle_impact (saf_vehicle.c)
damage_vehicle_rammed	saf_vehicle_vehicle_rammed (saf_vehicle.c)
database_detection_query	detectable (detection.c)
database_df_damage_query	damage_vehicle_impact (damage.c)
database_if_damage_query	damage_indirect_fire (damage.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
database_init	init_stuff (main.c)
database_read	database_init (main.c)
dbm_access	dbm_fetch (ndbm.c)
dbm_close	yp_endhostent (yp_gethostent.c)
dbm_nextkey	dbm_firstkey (ndbm.c)
dcalchash	dbm_fetch (ndbm.c)
deallocate_bitfield	destroy_reporter (reporter.c)
	deallocate_spotter_tables (spotter.c)
deallocate_safobj	composite_go_away (composite.c)
	remote_go_away (remote.c)
	saf_vehicle_go_away (saf_vehicle.c)
deallocate_spotter_tables	destroy_spotter (spotter.c)
deferred_fncl	saf_vehicle_catastrophic_kill (saf_vehicle.c)
	sbx_connection_reset_msg (sbx.c)
	sbx_connection_service_poll_msg (sbx.c)
	sbx_connection_stat_pulse (sbx.c)
	sbx_connection_synch_received (sbx.c)
	sbx_connection_wat_pulse (sbx.c)
delitem	dbm_delete (ndbm.c)
dequeue_terrain_patch	rotate_queue (cache_queue.c)
	terrain_cache_inquire (cache_query.c)
destroy_airveh	saf_vehicle_go_away (saf_vehicle.c)
destroy_area_cm	destroy_cm_data (cm.c)
destroy_cis	activate_new_cis (cis.c)
	clear_cis_stack (cis.c)
	composite_go_away (composite.c)
	pop_cis (cis.c)
	pop_resumable_cis (cis.c)
destroy_cm	cm_delete_cm_from_overlay (cm.c)
destroy_cm_data	cm_delete_cm_from_overlay (cm.c)
destroy_cm_list	navigator_reset_overlay (navigator.c)
	navigator_set_overlay (navigator.c)
destroy_cm_list_item	destroy_cm_list (cm.c)
	cm_delete_cm_from_overlay (cm.c)
destroy_collision	saf_vehicle_go_away (saf_vehicle.c)
destroy_damage	saf_vehicle_go_away (saf_vehicle.c)
destroy_detection	saf_vehicle_go_away (saf_vehicle.c)
destroy_driver	saf_vehicle_go_away (saf_vehicle.c)
destroy_entity	composite_go_away (composite.c)
	remote_go_away (remote.c)
	saf_vehicle_go_away (saf_vehicle.c)
destroy_grid_entry_list	remote_deactivate (remote.c)
	remote_go_away (remote.c)
	saf_vehicle_go_away (saf_vehicle.c)
destroy_groundveh	saf_vehicle_go_away (saf_vehicle.c)
destroy_line_cm	destroy_cm_data (cm.c)
destroy_logistics	saf_vehicle_go_away (saf_vehicle.c)
destroy_missile	destroy_weapon_systems (weapons.c)
destroy_overlay	cm_delete_overlay (cm.c)
destroy_overlay_list_item	cm_delete_overlay (cm.c)
destroy_pilot	saf_vehicle_go_away (saf_vehicle.c)
destroy_point_cm	destroy_cm_data (cm.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
destroy_predicates	composite_go_away (composite.c)
destroy_rem_veh_id_item	remove_removed_vehicle (reporter.c)
	destroy_removed_vehicles (reporter.c)
destroy_removed_vehicles	destroy_reporter (reporter.c)
destroy_reporter	composite_go_away (composite.c)
destroy_route	destroy_cm_data (cm.c)
	cm_add_route (cm.c)
destroy_routepoint	destroy_route (route.c)
destroy_shell_summary	destroy_shellings (reporter.c)
destroy_shellings	destroy_reporter (reporter.c)
destroy_spotter	composite_go_away (composite.c)
destroy_targeting	saf_vehicle_go_away (saf_vehicle.c)
destroy_tickable	composite_go_away (composite.c)
	remote_go_away (remote.c)
	saf_vehicle_go_away (saf_vehicle.c)
destroy_turret	saf_vehicle_go_away (saf_vehicle.c)
destroy_veh_id_item	remove_clustered_vehicle (reporter.c)
	destroy_veh_id_list (reporter.c)
	remove_dead_clustered_vehicles (reporter.c)
destroy_veh_id_list	update_clusters (reporter.c)
	destroy_overlay (cm.c)
	destroy_vehicle_cluster (reporter.c)
destroy_vehicle	remote_go_away (remote.c)
	saf_vehicle_go_away (saf_vehicle.c)
destroy_vehicle_cluster	destroy_vehicle_clusters (reporter.c)
destroy_vehicle_clusters	destroy_reporter (reporter.c)
destroy_weapon_systems	saf_vehicle_go_away (saf_vehicle.c)
destroy_zone_cm	destroy_cm_data (cm.c)
detachnode	yp_match (yp_match.c)
detect_building_on_path_tick	collision_tick (collision.c)
detect_collision_tick	collision_dead_tick (collision.c)
	collision_tick (collision.c)
detect_imminent_collision_tick	collision_tick (collision.c)
detectable	detection_tick (detection.c)
detection_remove_vehicles	saf_vehicle_remove_vehicles (saf_vehicle.c)
detection_save_weight	targeting_tick (targeting.c)
detection_show	saf_vehicle_show (saf_vehicle.c)
detection_show_type	detection_show (detection.c)
detection_tick	targeting_tick (targeting.c)
detzcode	tzload (ctime.c)
diffraction_diff	pve_checkvis (pve_checkvis.c)
diffv	within_delta (misc.c)
distance	cm_point_line_intersection (navigator.c)
	find_closest_building (building_check.c)
dn_comp	res_mkquery (res_mkquery.c)
dn_expand	getanswer (dns_getnamadr.c)
dn_find	dn_comp (res_comp.c)
dn_skipname	getanswer (dns_getnamadr.c)
do_heap_collect	parser_heap_collect (parser.c)
do_heap_statistics	parser_heap_statistics (parser.c)
do_heap_verify	parser_heap_verify (parser.c)
do_mode_cmd	net_norm (net_mode.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
do_mode_cmd_147	do_mode_cmd (net_mode.c)
do_mode_cmd_cmc	do_mode_cmd (net_mode.c)
doit	yp_setnetgrent (yp_gnetgr.c)
	yp_innetgr (yp_innetgr.c)
dotv	within_delta (misc.c)
driver_change_speed_cmd	saf_vehicle_change_speed (saf_vehicle.c)
driver_execute_overlay	saf_vehicle_execute_overlay (saf_vehicle.c)
driver_executing_immediate_command	saf_vehicle_useless (saf_vehicle.c)
	saf_vehicle_generate_status_report (saf_vehicle.c)
driver_face_direction_cmd	saf_vehicle_face_direction (saf_vehicle.c)
driver_follow_leader	saf_vehicle_set_leader (saf_vehicle.c)
driver_follow_vehicle_cmd	saf_vehicle_follow_vehicle (saf_vehicle.c)
driver_forget_about_forps	saf_vehicle_reset_station_keeper (saf_vehicle.c)
driver_goto_point_cmd	saf_vehicle_goto_point (saf_vehicle.c)
driver_halt_cmd	saf_vehicle_halt (saf_vehicle.c)
driver_remove_vehicles	saf_vehicle_remove_vehicles (saf_vehicle.c)
driver_resume_from_collision	saf_vehicle_collision_over (saf_vehicle.c)
driver_resume_mission_cmd	saf_vehicle_resume_mission (saf_vehicle.c)
	driver_execute_overlay (driver.c)
driver_set_direction	saf_vehicle_set_direction (saf_vehicle.c)
driver_set_leader_mis	saf_vehicle_set_leader (saf_vehicle.c)
driver_set_route	saf_vehicle_set_route (saf_vehicle.c)
driver_set_speed	saf_vehicle_set_speed (saf_vehicle.c)
driver_show	saf_vehicle_show (saf_vehicle.c)
driver_simulator_in_command	driver_simulator_in_command (driver.c)
	saf_vehicle_simulator_in_command (saf_vehicle.c)
driver_stop_mission	saf_vehicle_cancel_overlay (saf_vehicle.c)
driver_tick	saf_vehicle_tick (saf_vehicle.c)
dstsetkernel	tzsetkernel (ctime.c)
eliminate_duplicates	generate_route_from_route_msg (route.c)
eliminate_vehicles	saf_reset_for_workstation (saf.c)
	sbx_connection_reset_msg (sbx.c)
	saf_complete_reset (saf.c)
enable_predicate	enable_predicates (predicates.c)
enable_predicates	adjust_behaviors (cis.c)
endnetgrent	yp_getpwent (yp_getpwent.c)
enemy_disposition	action_drill_needed (predicates.c)
	hasty_attack_needed (predicates.c)
enqueue_on_rcvq	protocol_sim_process (simnet.c)
enqueue_terrain_patch	rotate_queue (cache_queue.c)
	terrain_cache_inquire (cache_query.c)
entity_fill_in_appearance_data	composite_fill_in_appearance_data (composite.c)
	saf_vehicle_fill_in_appearance_data (saf_vehicle.c)
	remote_fill_in_appearance_data (remote.c)
entity_fill_in_position_data	composite_fill_in_position_data (composite.c)
	saf_vehicle_fill_in_position_data (saf_vehicle.c)
	remote_fill_in_position_data (remote.c)
entity_show	composite_show (composite.c)
	saf_vehicle_show (saf_vehicle.c)
	remote_show (remote.c)
exaggerate_bridges	generate_route_from_route_msg (route.c)
execute_overlay	cm_execute_overlay (cm.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
execve	start_simnet (simnet.c)
existnd	__start (./crt1text.s)
	abort_handler (main.c)
	cons (list.c)
	create_bridges (bridges.c)
	create_buildings (trees.c)
	create_contours (trees.c)
	create_lakes (bridges.c)
	create_river_ints (rivers.c)
	create_rivers (rivers.c)
	create_road_ints (roads.c)
	create_roads (roads.c)
	create_tree_canopies (trees.c)
	create_trees (trees.c)
exit	res_init (res_init.c)
	create_river_ints (rivers.c)
	exit_handler (main.c)
	init_terrain_stuff (main.c)
	read_feature (terrain.c)
	read_machine_file (main.c)
	read_quadtree (terrain.c)
	saf_print_help (main.c)
	scheduler_init (maint.c)
	start_simnet (simnet.c)
	yylex (lexer.c)
exit_all_sbx_conns	abort_handler (main.c)
	start_simnet (simnet.c)
exit_handler	exit_handler (main.c)
	init_stuff (main.c)
	main (main.c)
	saf_exit (main.c)
expand_road_route	generate_route_from_route_msg (route.c)
fake_resupply	vehicle_fake_resupply (parser.c)
fclose	AssocReadParams (params.c)
	existnd (res_init.c)
	freopen (freopen.c)
	hostalias (res_query.c)
	reader_read_file (parser.y)
	res_init (res_init.c)
	vis_nextserv (vis.c)
fcntl	load_dom_binding (yp_bind.c)
	openlog (syslog.c)
fflush	_filbuf (filbuf.c)
	buf_rudp_discard_all_buffers (buf_conn.c)
	fclose (flsbuf.c)
	fprintf (fprintf.c)
	fseek (fseek.c)
	init_stuff (main.c)
	init_terrain_stuff (main.c)
	parser_invoke_fcn_on_char (geyer.c)
	read_machine_file (main.c)
	rewind (rew.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
fflush (cont.)	rudp_discard_all_buffers (rel_conn.c) rudp_post_message (rel_conn.c) sbx_connection_reset_msg (sbx.c) write_string_to_tty (more.c)
fgetpwent	ht_getpwent (ht_getpwent.c)
fgets	AssocReadParams (params.c) hostalias (res_query.c) parse_servfile (vis.c) res_init (res_init.c) doit (yp_gnetgr.c)
fill	simnet_send_status_change (DataCollectionPDU.c)
fill_dc_pdu_tags	change_movement_and_report (cis.c)
fill_generic_cis_report	activate_new_cis (cis.c)
fill_in_appearance_data	broadcast_appearance_data (sbx.c) broadcast_pae_data (sbx.c) sbx_connection_stat_pulse (sbx.c)
fill_in_echelon_data	broadcast_pae_data (sbx.c)
fill_in_position_data	sbx_connection_stat_pulse (sbx.c) broadcast_pae_data (sbx.c) sbx_connection_wat_pulse (sbx.c) sbx_connection_stat_pulse (sbx.c)
fill_ivis_pdu_tags	ivis_send_contact_report (IvisPDU.c) ivis_send_shell_report (IvisPDU.c) ivis_send_spot_report (IvisPDU.c)
fill_ivis_report_tags	ivis_send_shell_report (IvisPDU.c) ivis_send_spot_report (IvisPDU.c) ivis_send_contact_report (IvisPDU.c)
fill_sbx_opfor_header	broadcast_appearance_data (sbx.c) broadcast_pae_data (sbx.c) broadcast_veh_is_gone (sbx.c) composite_generate_status_report (composite.c) fill_generic_cis_report (cis.c) gasp (main.c) remote_tick (remote.c) saf_vehicle_checkpoint_state (saf_vehicle.c) saf_vehicle_generate_status_report (saf_vehicle.c) sbx_connection_process_ground_impact (sbx.c) sbx_connection_process_indirect_fire (sbx.c) sbx_connection_process_vehicle_impact (sbx.c) sbx_connection_stat_pulse (sbx.c) sbx_connection_synch_received (sbx.c) sbx_connection_wat_pulse (sbx.c) sbx_printf (sbx.c) send_contact_report (reporter.c) send_shelling_report (reporter.c) send_spot_report (reporter.c) send_stealth_gone_msg (remote.c)
fill_sim_pdu_tags	simnet_send_appearance (SimulationPDU.c) simnet_send_collision (SimulationPDU.c) simnet_send_deactivate (SimulationPDU.c) simnet_send_fire (SimulationPDU.c)

**Called Function**

fill\_sim\_pdu\_tags (cont.)

find\_a\_quad  
 find\_closest\_building  
 find\_extra\_contour\_info  
 find\_height\_on\_poly  
 find\_new\_host\_mask  
 find\_support  
 find\_tag

find\_tag\_sorted

findbucket  
 finddatum  
 fire\_missile\_at\_target  
 fire\_weapon\_at\_target  
 firestatus\_to\_string

fix\_coords  
 flock  
 fly\_missile  
 fly\_round  
 fmat\_to\_rmat  
 followvehicle  
 open

**Calling Function (filename)**

simnet\_send\_impact (SimulationPDU.c)  
 simnet\_send\_indirect\_fire (SimulationPDU.c)  
 simnet\_send\_radiate (SimulationPDU.c)  
 simnet\_send\_resupply\_cancel (SimulationPDU.c)  
 simnet\_send\_resupply\_received (SimulationPDU.c)  
 simnet\_send\_resupply\_request (SimulationPDU.c)  
 next\_road\_point (roads.c)  
 buildings\_thru (building\_check.c)  
 create\_contours (trees.c)  
 tdb\_get\_z (elevation.c)  
 generate\_vehicle\_id (id\_hash.c)  
 tdb\_get\_z (elevation.c)  
 create\_composite (composite.c)  
 create\_damage (damage.c)  
 create\_saf\_vehicle (saf\_vehicle.c)  
 create\_unit (create.c)  
 create\_weapon\_systems (weapons.c)  
 database\_if\_damage\_query (if\_damage.c)  
 ft\_float (misc.c)  
 ft\_int (misc.c)  
 ft\_symbol (misc.c)  
 ft\_table (misc.c)  
 ft\_untagged\_table (misc.c)  
 init\_mappings (map.c)  
 make\_create\_list (create.c)  
 map\_echelon\_symbol\_to\_echelon\_number (map.c)  
 map\_echelon\_type\_symbol\_to\_icon\_number (map.c)  
 map\_icon\_symbol\_to\_icon\_number (map.c)  
 read\_machine\_file (main.c)  
 weapon\_configure (weapons.c)  
 database\_if\_damage\_query (if\_damage.c)  
 database\_df\_damage\_query (df\_damage.c)  
 realloc (malloc.c)  
 dbm\_fetch (ndbm.c)  
 shoot\_target (gunner.c)  
 shoot\_target (gunner.c)  
 sbx\_set\_targeting\_parameters (sbx.c)  
 targeting\_show (targeting.c)  
 test\_maxima (pve\_checkvis.c)  
 \_yp\_dobind (yp\_bind.c)  
 fly\_round (weapons.c)  
 gunner\_tick (gunner.c)  
 remote\_tick (remote.c)  
 driver\_tick (driver.c)  
 AssocReadParams (params.c)  
 existnd (res\_init.c)  
 hostalias (res\_query.c)  
 reader\_read\_file (parser.y)  
 res\_init (res\_init.c)  
 vis\_nextserv (vis.c)



<u>Called Function</u>	<u>Calling Function (filename)</u>
forceID_to_string	sbx_connection_create_unit_msg (sbx.c) sbx_connection_show (sbx.c) entity_show (entity.c) start_simnet (simnet.c) cvt (doprnt.c) bse (breakset.c) buffer_deallocate (queue_fix.c) buffer_allocate (queue_fix.c) check_hits (pve_checkvis.c) clip_to_tdb (pve_checkvis.c) clnt_pcreateerror (clnt_perror.c) clnt_perror (clnt_perror.c) get_args (fncl.c) init_stuff (main.c) invoke (invoke.c) mat_rot_init (mat_r_init.c) parser_invoke_fcn_on_char (geyer.c) patch (pve_checkvis.c) proc_switches (args.c) pve_checkvis (pve_checkvis.c) rassoc_sym (map.c) reader_read_file (parser.y) rpc_perror (clnt_perror.c) rpc_perror1 (clnt_perror.c) rpc_perror2 (clnt_perror.c) scheduler_init (maint.c) simple_queue_allocate (bufpool.c) sort_trim_hits (pve_checkvis.c) store_hit (pve_checkvis.c) tag_error (tags.c) test_maxima (pve_checkvis.c) treelines (pve_checkvis.c) tty_invoke_fcn_on_char (breakset.c) tty_malloc_break_set (breakset.c) warn_about_point_space (terrain.c) which_event_ring (maint.c) yyerror (parser.y) yylex (lexer.c)
fork	
fp_class_d	
fprintf	
fragment_route	cm_delete_cm_from_overlay (cm.c) AssocClose (close.c) cache_and_file_terminate (cache_alloc.c) cfree (calloc.c) clntudp_bufcreate (clnt_udp.c) clntudp_destroy (clnt_udp.c) copy_stack_to_array (parser.y) fclose (flsbuf.c) free_stack (parser.y) heap_deallocate (alloc.c) parse_servfile (vis.c) realloc (malloc.c)
free	

<u>Called Function</u>	<u>Calling Function (filename)</u>
free (cont.)	setbuf (setbuf.c) xdr_bytes (xdr.c) xdr_string (xdr.c)
free_function	cancel_fncl (fncl.c) invoke (invoke.c)
free_list	buildings_thru (building_check.c) free_list (list.c) free_water_list (water_check.c) get_building_indecies (building_check.c) get_water_indecies (water_check.c) point_in_building (building_check.c)
free_stack	free_stack (parser.y) yyparse (parser.y)
free_water_list	water_check (water_check.c)
freeminuslist	yp_setgrent (yp_getgrent.c)
freeminuslist	yp_setpwent (yp_getpwent.c)
freenode	makenode (yp_match.c)
freopen	tty_setup_modes (setup.c)
fscanf	existnd (res_init.c)
fseek	ht_fgetgrent (ht_getgrent.c)
fstat	_filbuf (filbuf.c) _flsbuf (flsbuf.c)
ft_float	tdb_get_tdb_info (tdb_init.c) airveh_init (flyingveh.c) create_damage (damage.c) create_groundveh (groundveh.c) create_missile (missile.c) create_saf_vehicle (saf_vehicle.c) create_targeting (targeting.c) create_turret (turret.c) weapon_configure (weapons.c)
ft_int	create_saf_vehicle (saf_vehicle.c) create_unit (create.c) get_guises (saf_vehicle.c) lookup_cis_default_speed (cis.c) lookup_cis_resumable (cis.c) lookup_cis_situational (cis.c) weapon_configure (weapons.c)
ft_symbol	create_damage (damage.c) create_targeting (targeting.c) create_weapon_systems (weapons.c) lookup_cis_communication_string (cis.c) lookup_cis_formation (cis.c) lookup_cis_movement_method (cis.c)
ft_table	weapon_configure (weapons.c) create_weapon_systems (weapons.c) get_formation_layout (formation.c) lookup_cis_communication_string (cis.c) lookup_cis_default_speed (cis.c) lookup_cis_enabled_predicates (cis.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
ft_table (cont.)	lookup_cis_formation (cis.c)
	lookup_cis_movement_method (cis.c)
	lookup_cis_resumable (cis.c)
	lookup_cis_situational (cis.c)
ft_untagged_table	create_composite (composite.c)
ftell	ht_fgetgrent (ht_getgrent.c)
ftime	get_millisecond_time (time.c)
	init_clocks (time.c)
fvec_to_rvec	compute_damage_keys (df_damage.c)
generate_a_deactivate	saf_vehicle_go_away (saf_vehicle.c)
generate_in_place_route	cm_execute_overlay (cm.c)
generate_indirect_fire_pkt	sbx_connection_generate_arty_msg (sbx.c)
generate_route_from_route_msg	cm_add_route (cm.c)
generate_status_report	sbx_connection_query_sub_state (sbx.c)
generate_vehicle_id	create_composite (composite.c)
	create_missile (missile.c)
	create_saf_vehicle (saf_vehicle.c)
generate_weapon_hit	impact_weapon (weapons.c)
generate_weapon_miss	impact_weapon (weapons.c)
get_a_leader	commander_attack (commander.c)
	commander_change_speed (commander.c)
	commander_execute_overlay (commander.c)
	commander_face_direction (commander.c)
	commander_follow_vehicle (commander.c)
	commander_goto_point (commander.c)
	commander_halt (commander.c)
	commander_land (commander.c)
	commander_set_mission_direction (commander.c)
	commander_set_mission_speed (commander.c)
	commander_simulator_in_command (commander.c)
get_args	periodic_fncl (fncl.c)
	deferred_fncl (fncl.c)
get_binder_port	_yp_dobind (yp_bind.c)
get_building_indecies	point_in_building (building_check.c)
	buildings_thru (building_check.c)
get_control_measure	cm_add_zone (cm.c)
	cm_add_route (cm.c)
	cm_add_point (cm.c)
	cm_add_line (cm.c)
	cm_add_area (cm.c)
get_device_number	open_cmc (net_open.c)
get_formation_layout	get_station_info (formation.c)
get_grid_number	find_support (elevation.c)
get_guises	create_missile (missile.c)
	create_saf_vehicle (saf_vehicle.c)
get_i_and_t_from_normal	missile_maybe_hit_target (missile.c)
get_impact_and_trajectory	get_impact_and_trajectory (impact.c)
get_leader_state	generate_weapon_hit (weapons.c)
get_local_address	followvehicle (driver.c)
get_locks	open_io_connections (sbx.c)
	open_cmc (net_open.c)

**Called Function**

get\_me\_a\_random\_fraction

get\_millisecond\_time

et\_next\_circle\_point

get\_overlay

get\_quad\_nodes

get\_quad\_nodes\_internal

get\_relative\_vehicle\_agility

get\_sbx\_from\_port

get\_sender\_of\_last\_packet

get\_soil\_type

get\_station\_info

get\_string

get\_symbol

**Calling Function (filename)**

check\_prob (random.c)  
 create\_saf\_vehicle (saf\_vehicle.c)  
 damage\_indirect\_fire (damage.c)  
 damage\_vehicle\_impact (damage.c)  
 damage\_vehicle\_rammed (damage.c)  
 detectable (detection.c)  
 generate\_weapon\_miss (weapons.c)  
 randomize\_vector (impact.c)  
 reporter\_tick (reporter.c)  
 targeting\_tick (targeting.c)  
 turret\_scan (turret.c)  
 buf\_rudp\_open (buf\_conn.c)  
 buf\_rudp\_tick (buf\_conn.c)  
 change\_fncl\_period (fncl.c)  
 create\_tickable (tickable.c)  
 deferred\_fncl (fncl.c)  
 init\_stuff (main.c)  
 invoke\_functions\_until (sched.c)  
 perf\_monitor\_on (perf.c)  
 periodic\_fncl (fncl.c)  
 report\_id\_hashing\_statistics (id\_hash.c)  
 rudp\_init (rel\_conn.c)  
 rudp\_open (rel\_conn.c)  
 rudp\_show (rel\_conn.c)  
 sbx\_connection\_synch\_received (sbx.c)  
 set\_critical\_performance\_level (perf.c)  
 start\_collecting\_id\_hashing\_statistics (id\_hash.c)  
 wait\_until (sched.c)  
 pilot\_orbithold (pilot.c)  
 cm\_add\_line (cm.c)  
 cm\_add\_route (cm.c)  
 cm\_add\_zone (cm.c)  
 cm\_add\_point (cm.c)  
 cm\_add\_area (cm.c)  
 get\_building\_indecies (building\_check.c)  
 get\_water\_indecies (water\_check.c)  
 get\_quad\_nodes\_internal (search.c)  
 get\_quad\_nodes (search.c)  
 fire\_weapon\_at\_target (weapons.c)  
 sbx\_connection\_send\_to\_port (sbx.c)  
 parser\_create\_vehicle (parser.c)  
 protocol\_sim\_process (simnet.c)  
 protocol\_stealth\_process (simnet.c)  
 simnet\_tick (simnet.c)  
 groundveh\_move (groundveh.c)  
 remote\_tick (remote.c)  
 composite\_assume\_formation\_internal (composite.c)  
 yylex (lexer.c)  
 cm\_add\_area (cm.c)  
 cm\_add\_line (cm.c)  
 cm\_add\_point (cm.c)  
 cm\_add\_zone (cm.c)

**Called Function****Calling Function (filename)**

get_symbol (cont.)	cm_execute_overlay (cm.c) create_unit (create.c) get_string (symbol.c) init_global_symbols (symbols.c) parser_create_vehicle (parser.c) read_machine_file (main.c) sbx_change_formation (sbx.c) sbx_connection_create_unit_msg (sbx.c) yylex (lexer.c) yylex (lexer.c) yyparse (parser.y)
get_symbol_value	get_turret (formation.c) get_formation_layout (formation.c)
get_turret	net_open (net_open.c)
get_type	followvehicle (driver.c)
get_unit_direction	water_check (water_check.c)
get_water_indecies	dns_gethostbyname (dns_getnamadr.c) dns_gethostbyaddr (dns_getnamadr.c)
getanswer	dbm_forder (ndbm.c)
getbit	ht_innetgr (ht_innetgr.c)
getdomainname	_f_morefiles (findiop.c)
getdtablesize	_rpc_dtablesize (rpcdtablesize.c)
getenv	vis_nextserv (vis.c) perror (perror.c) hostalias (res_query.c) timezone (timezone.c) res_init (res_init.c) tzset (ctime.c)
geteuid	check_binder_up (yp_bind.c)
getfirstfromyellow	yp_getgrent (yp_getgrent.c)
getfirstfromyellow	yp_getpwent (yp_getpwent.c)
getgidfromyellow	matchgid (yp_getgrent.c)
gethostbyname	get_local_address (udp_berkeley.c)
gethostent	interpret (yp_gethostent.c)
gethostname	parser_init (parser.c) udp_open (udp_berkeley.c) res_init (res_init.c)
getnamefromyellow	get_local_address (udp_berkeley.c)
getnamefromyellow	yp_getpwent (yp_getpwent.c)
getnetent	matchname (yp_getgrent.c)
getnetgrent	interpret (yp_gnetent.c)
getnextfromyellow	yp_getpwent (yp_getpwent.c)
getnextfromyellow	yp_getgrent (yp_getgrent.c)
getpagesize	yp_getpwent (yp_getpwent.c)
getpid	malloc (malloc.c) newborn (yp_bind.c) abort_handler (main.c) syslog (syslog.c) bindresvport (bindresvport.c) clntudp_bufcreate (clnt_udp.c)
getprotoent	interpret (yp_getpent.c)
getservent	interpret (yp_getservent.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
getsockname	check_binding (yp_bind.c)
gettimeofday	ftime (ftime.c)
	tzsetkernel (ctime.c)
	clntudp_bufcreate (clnt_udp.c)
	time (time.c)
getuidfromyellow	matchuid (yp_getpwent.c)
gidof	matchgid (yp_getgrent.c)
go_away	eliminate_vehicles (saf.c)
grid_locword	test_maxima (pve_checkvis.c)
ground_impact_to_sbx	protocol_sim_process (simnet.c)
ground_level	pilot_start_landed (pilot.c)
	pilot_start_takingoff (pilot.c)
	air_tick (flyingveh.c)
groundveh_mobility_kill	saf_vehicle_catastrophic_kill (saf_vehicle.c)
	saf_vehicle_mobility_kill (saf_vehicle.c)
groundveh_move	groundveh_tick (groundveh.c)
groundveh_tick	saf_vehicle_tick (saf_vehicle.c)
grskip	ht_fgetgrent (ht_getgrent.c)
grskip	interpret (yp_getgrent.c)
gtty	tty_setup_modes (setup.c)
gunner_round_flying	pilot_hoverattack (pilot.c)
	saf_vehicle_tick (saf_vehicle.c)
gunner_tick	targeting_tick (targeting.c)
hasty_attack_needed	check_predicates (predicates.c)
heading_to_compass	send_spot_report (reporter.c)
	send_contact_report (reporter.c)
	show_vehicle_cluster (reporter.c)
heap_allocate	_queue_hanger_hang_this (queue_fix.c)
	add_executing_unit (cm.c)
	add_removed_vehicle (reporter.c)
	add_vehicle_to_cluster (reporter.c)
	allocate_bitfield (bitfield.c)
	allocate_points (terrain.c)
	allocate_safobj (safobj.c)
	buf_rudp_init (buf_conn.c)
	buffer_allocate (queue_fix.c)
	buffer_statistics_init (queue_fix.c)
	cm_execute_overlay (cm.c)
	cm_get_cm_from_overlay (cm.c)
	cm_recompute_cm_from_overlay (cm.c)
	cons (list.c)
	create_airveh (flyingveh.c)
	create_bridges (bridges.c)
	create_buildings (trees.c)
	create_cis (cis.c)
	create_collision (collision.c)
	create_commander (commander.c)
	create_composite (composite.c)
	create_contours (trees.c)
	create_damage (damage.c)
	create_detection (detection.c)

**Called Function**

heap\_allocate (cont.)

**Calling Function (filename)**

create\_driver (driver.c)  
 create\_entity (entity.c)  
 create\_groundveh (groundveh.c)  
 create\_lakes (bridges.c)  
 create\_logistics (logistics.c)  
 create\_missile (missile.c)  
 create\_navigator (navigator.c)  
 create\_new\_cluster (reporter.c)  
 create\_new\_shelling (reporter.c)  
 create\_pilot (pilot.c)  
 create\_predicates (predicates.c)  
 create\_remote (remote.c)  
 create\_reporter (reporter.c)  
 create\_river\_ints (rivers.c)  
 create\_rivers (rivers.c)  
 create\_road\_ints (roads.c)  
 create\_roads (roads.c)  
 create\_routepoint (route.c)  
 create\_saf\_vehicle (saf\_vehicle.c)  
 create\_spotter (spotter.c)  
 create\_targeting (targeting.c)  
 create\_tickable (tickable.c)  
 create\_tree\_canopies (trees.c)  
 create\_trees (trees.c)  
 create\_turret (turret.c)  
 create\_vehicle (vehicle.c)  
 create\_weapon\_systems (weapons.c)  
 deferred\_fncl (fncl.c)  
 generate\_in\_place\_route (route.c)  
 generate\_route\_from\_route\_msg (route.c)  
 get\_args (fncl.c)  
 get\_control\_measure (cm.c)  
 get\_overlay (cm.c)  
 init\_grid\_tables (iterator.c)  
 logistics\_supply\_offer\_received (logistics.c)  
 open\_io\_connections (sbx.c)  
 periodic\_fncl (fncl.c)  
 read\_feature (terrain.c)  
 read\_quadtree (terrain.c)  
 remote\_next\_road\_point (remote.c)  
 rudp\_init (rel\_conn.c)  
 sbx\_connection\_init (sbx.c)  
 scheduler\_init (maint.c)  
 simple\_queue\_allocate (bufpool.c)  
 Alloc (par\_unix.c)  
 tty\_malloc\_break\_set (breakset.c)  
 udp\_open (udp\_berkeley.c)  
 init\_stuff (main.c)  
 \_queue\_hanger\_unhang (queue\_fix.c)  
 buffer\_deallocate (queue\_fix.c)  
 composite\_go\_away (composite.c)  
 deallocate\_bitfield (bitfield.c)

heap\_calloc

heap\_create

heap\_deallocate

**Called Function**

heap\_deallocate (cont.)

**Calling Function (filename)**

	deallocate_safobj (safobj.c)
	destroy_airveh (flyingveh.c)
	destroy_area_cm (cm.c)
	destroy_cis (cis.c)
	destroy_cm (cm.c)
	destroy_cm_list_item (cm.c)
	destroy_collision (collision.c)
	destroy_damage (damage.c)
	destroy_detection (detection.c)
	destroy_driver (driver.c)
	destroy_entity (entity.c)
	destroy_groundveh (groundveh.c)
	destroy_line_cm (cm.c)
	destroy_logistics (logistics.c)
	destroy_missile (missile.c)
	destroy_overlay (cm.c)
	destroy_overlay_list_item (cm.c)
	destroy_pilot (pilot.c)
	destroy_point_cm (cm.c)
	destroy_predicates (predicates.c)
	destroy_rem_veh_id_item (reporter.c)
	destroy_reporter (reporter.c)
	destroy_route (route.c)
	destroy_routepoint (route.c)
	destroy_shell_summary (reporter.c)
	destroy_spotter (spotter.c)
	destroy_targeting (targeting.c)
	destroy_tickable (tickable.c)
	destroy_turret (turret.c)
	destroy_veh_id_item (reporter.c)
	destroy_vehicle (vehicle.c)
	destroy_vehicle_cluster (reporter.c)
	destroy_weapon_systems (weapons.c)
	destroy_zone_cm (cm.c)
	free_function (maint.c)
	free_list (list.c)
	logistics_tick (logistics.c)
	queue_flush_hangers (queue_fix.c)
	remote_go_away (remote.c)
	remove_dead_clustered_vehicles (reporter.c)
	remove_duplicates (list.c)
	remove_executing_unit (cm.c)
	remove_shelling_cluster (reporter.c)
	saf_vehicle_go_away (saf_vehicle.c)
	simple_queue_deallocate (bufpool.c)
	splice_out_vehicle_cluster (reporter.c)
	udp_close (udp_berkeley.c)
heap_destroy	abort_handler (main.c)
	exit_handler (main.c)
helo_tick	air_tick (flyingveh.c)
host_local_vehicle_predicate	simnet_send_collision (SimulationPDU.c)
	simnet_send_impact (SimulationPDU.c)



**Called Function**

host\_loopback\_function

hostalias

ht\_endgrent

ht\_endhostent

ht\_endnetent

ht\_endnetgrent

ht\_endprotoent

ht\_endpwent

ht\_endrpcent

ht\_endservent

ht\_fgetgrent

ht\_getgrent

ht\_gethostent

ht\_getnetent

ht\_getnetgrent

ht\_getprotoent

ht\_getpwent

ht\_getrpcent

ht\_getservent

ht\_setgrent

ht\_sethostent

ht\_setnetent

ht\_setnetgrent

ht\_setprotoent

ht\_setpwent

ht\_setrpcent

ht\_setservent

htons

hull\_to\_world\_from\_direction

hull\_to\_world\_from\_orientation

icon\_from\_object\_type

identify\_version

idle\_tick

impact\_weapon

index

indirect\_fire\_to\_sbx

induce\_roll

induce\_tail\_spin

**Calling Function (filename)**

ivis\_send\_contact\_report (IvisPDU.c)

ivis\_send\_shell\_report (IvisPDU.c)

ivis\_send\_spot\_report (IvisPDU.c)

simnet\_send\_collision (SimulationPDU.c)

simnet\_send\_fire (SimulationPDU.c)

simnet\_send\_impact (SimulationPDU.c)

simnet\_send\_indirect\_fire (SimulationPDU.c)

res\_search (res\_query.c)

ht\_getgrgid (ht\_getgrgid.c)

\_endhtent (ht\_getnamadr.c)

ht\_getnetbyaddr (ht\_gnbyaddr.c)

ht\_innetgr (ht\_innetgr.c)

ht\_getprotobynumber (ht\_getproto.c)

ht\_getpwnam (ht\_getpwent.c)

ht\_getrpcbynumber (ht\_grpcent.c)

ht\_getservbyname (ht\_gservent.c)

ht\_getgrent (ht\_getgrent.c)

ht\_getgrgid (ht\_getgrgid.c)

\_host\_interpret (ht\_gethent.c)

ht\_getnetbyaddr (ht\_gnbyaddr.c)

ht\_innetgr (ht\_innetgr.c)

ht\_getprotobynumber (ht\_getproto.c)

ht\_getpwnam (ht\_getpwent.c)

ht\_getrpcbynumber (ht\_grpcent.c)

ht\_getservbyname (ht\_gservent.c)

ht\_getgrgid (ht\_getgrgid.c)

\_sethtent (ht\_getnamadr.c)

ht\_getnetbyaddr (ht\_gnbyaddr.c)

ht\_innetgr (ht\_innetgr.c)

ht\_getprotobynumber (ht\_getproto.c)

ht\_getpwnam (ht\_getpwent.c)

ht\_getrpcbynumber (ht\_grpcent.c)

ht\_getservbyname (ht\_gservent.c)

ht\_getservent (ht\_gservent.c)

fly\_missile (missile.c)

fire\_missile\_at\_target (missile.c)

plane\_tick (plane.c)

helo\_tick (helo.c)

remote\_tick (remote.c)

create\_saf\_vehicle (saf\_vehicle.c)

main (main.c)

pilot\_tick (pilot.c)

fly\_round (weapons.c)

parse\_servfile (vis.c)

res\_init (res\_init.c)

res\_mkquery (res\_mkquery.c)

strtok (strtok.c)

syslog (syslog.c)

timezone (timezone.c)

protocol\_sim\_process (simnet.c)

plane\_tick (plane.c)

plane\_tick (plane.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
inet_addr	interpret (yp_gethostent.c) sockaddr_init (udp_berkeley.c) res_init (res_init.c)
inet_makeaddr	nettoa (yp_gnetent.c)
inet_network	interpret (yp_gnetent.c)
inet_ntoa	get_local_address (udp_berkeley.c)
init_cache_map	cache_init (cache_alloc.c)
init_clocks	init_stuff (main.c)
init_global_symbols	init_stuff (main.c)
init_grid_entry_list	create_remote (remote.c) remote_init_vars (remote.c)
	create_saf_vehicle (saf_vehicle.c)
init_grid_tables	init_terrain_stuff (main.c)
init_mappings	database_init (main.c)
init_object_and_texture_names	tdb_init_memory (memory.c) tdb_init_cache (tdb_init.c)
init_patch_indices	memory_init (memory.c) cache_init (cache_alloc.c)
init_pilot_state_machine	create_pilot (pilot.c)
nit_saf_to_simnet_id_table	init_stuff (main.c)
init_safobj_table	init_stuff (main.c)
init_static_matrices	init_stuff (main.c)
init_stuff	main (main.c)
init_symbol_table	init_stuff (main.c)
init_target_items	update_target_list (targeting.c)
init_target_list	update_target_list (targeting.c) create_targeting (targeting.c)
init_terrain_cache	cache_init (cache_alloc.c)
init_terrain_stuff	init_stuff (main.c)
initialize_weapon_priority_list	create_weapon_systems (weapons.c)
nlist	lookup (yp_innetgr.c)
innetgr	yp_getpwent (yp_getpwent.c)
insert_function	periodic_fncl (fncl.c) change_fncl_period (fncl.c) deferred_fncl (fncl.c)
insert_grid_entry	init_grid_entry_list (iterator.c) update_grid_entry_list (iterator.c)
insert_periodic_function	invoke_functions_until (sched.c)
int_dist	closest_leader (formation.c) closest_to_a_leader (formation.c)
interesting_packet_test	host_loopback_function (simnet.c) simnet_tick (simnet.c)
interior_angle_between_vectors	angle_between_vectors (math.c) choose_skirt_point (collision.c)
	detectable (detection.c) next_road_point (roads.c)
	start_avoiding_collision (collision.c)
	start_disengaging (collision.c)
interpolate_curve	fire_weapon_at_target (weapons.c) database_detection_query (detection.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
interpret	ht_getrcent (ht_grpcent.c) yp_getgrnam (yp_getgrent.c) yp_gethostbyname (yp_gethostent.c) yp_getnetbyaddr (yp_gnetent.c) yp_getprotobynumber (yp_getpent.c) yp_getpwuid (yp_getpwent.c) yp_getrpcbynumber (yp_getrpcent.c) yp_getservbyport (yp_getservent.c)
interpretwithsave	yp_getgrent (yp_getgrent.c) yp_getpwent (yp_getpwent.c)
intervis_can_see_pt_to_pt	choose_target_and_weapon (targeting.c) fly_missile (missile.c) shoot_target (gunner.c) spotter_tick (spotter.c) track_target (gunner.c)
intervis_get_high_ground	change_movement_and_report (cis.c)
intervis_get_view	fire_weapon_at_target (weapons.c)
intervis_possibly_visible	detection_tick (detection.c)
intervis_pt_to_pt	intervis_can_see_pt_to_pt (intervis.c) intervis_get_view (intervis.c)
invoke	invoke_functions_until (sched.c)
nvoke_functions_until	invoke_functions_until (sched.c) main (main.c)
ioctl	access_cmc (net_acce.c) clntudp_bufcreate (clnt_udp.c) get_type (net_open.c) gtty (gtty.c) isatty (isatty.c) make_me_non_blocking (udp_berkeley.c) stty (stty.c) tty_restore_modes (setup.c) tty_setup_modes (setup.c)
is_cm_executed_in_list	cm_recompute_cm_from_overlay (cm.c)
is_probably_a_string	tag_error (tags.c)
satty	_flsbuf (flsbuf.c)
issue_reports	reporter_tick (reporter.c)
ivis_send_contact_report	send_contact_report (reporter.c)
ivis_send_shell_report	send_shelling_report (reporter.c)
ivis_send_spot_report	send_spot_report (reporter.c)
kill	existnd (res_init.c)
left_bottom_region	top_left_corner (minimum_clip.c)
left_column	minimum_clip (minimum_clip.c)
eft_edge	center_column (minimum_clip.c) left_column (minimum_clip.c)
line_intersection	cm_count_intersections (navigator.c) cm_intersection (navigator.c) cm_poly_intersection (navigator.c) count_intersections (intersection.c) seg_intersection (intersection.c)
line_intersection_core	line_intersection (intersection.c)
load_dom_binding	open_line_intersection (intersection.c) _yp_dobind (yp_bind.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
loader_tick	targeting_tick (targeting.c)
localtime	ctime (ctime.c)
logistics_remove_vehicles	saf_vehicle_remove_vehicles (saf_vehicle.c)
logistics_supply_offer_canceled	saf_vehicle_pro_sim (saf_vehicle.c)
logistics_supply_offer_received	saf_vehicle_pro_sim (saf_vehicle.c)
logistics_tick	saf_vehicle_tick (saf_vehicle.c)
lookup	yp_innetgr (yp_innetgr.c)
lookup_cis_communication_string	fill_generic_cis_report (cis.c)
lookup_cis_default_speed	check_predicates (predicates.c)
lookup_cis_enabled_predicates	adjust_behaviors (cis.c)
lookup_cis_formation	adjust_behaviors (cis.c)
lookup_cis_movement_method	adjust_behaviors (cis.c)
lookup_cis_resumable	activate_new_cis (cis.c)
	pop_resumable_cis (cis.c)
lookup_cis_situational	change_movement_and_report (cis.c)
lookup_vehicle_with_range_check	parser_set_targeting_parameters (parser.c)
	show_vehicle (parser.c)
	stealth_attach_to (parser.c)
	vehicle_defuel (parser.c)
	vehicle_fake_resupply (parser.c)
	vehicle_resupply (parser.c)
	fopen (fopen.c)
lseek	freopen (freopen.c)
	fseek (fseek.c)
	ftell (ftell.c)
	init_patch_indices (cache_init.c)
	memory_init (memory.c)
	rewind (rew.c)
	tldb_init_patch_guards (cache_init.c)
	terrain_cache_inquire (cache_query.c)
	__start (./crt1text.s)
main	targeting_tick (targeting.c)
major_detection_increase	targeting_tick (targeting.c)
major_spotter_increase	dbm_fetch (ndbm.c)
makdatum	yyparse (parser.y)
make_array	make_create_list (create.c)
make_create_list	create_unit (create.c)
make_leader	compute_who_follows_whom (formation.c)
make_me_non_blocking	udp_open (udp_berkeley.c)
make_new_hash_entry	saf_id_from_simnet_id (id_hash.c)
	generate_vehicle_id (id_hash.c)
makekey	lookup (yp_innetgr.c)
makenode	yp_match (yp_match.c)
malloc	_buf (clnt_perror.c)
	_filbuf (filbuf.c)
	_flsbuf (flsbuf.c)
	AssocCreateFreeList (free_list.c)
	AssocGrowFreeList (free_list.c)
	AssocOpen (open.c)
	cache_init (cache_alloc.c)
	calloc (calloc.c)
	clntudp_bufcreate (clnt_udp.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
malloc (cont.)	get_symbol (symbol.c) heap_allocate (alloc.c) make_array (parser.y) map_buffers (net_stuf.c) memory_init (memory.c) parse_servfile (vis.c) realloc (malloc.c) stack_push (parser.y) tdb_init_patch_guards (cache_init.c) xdr_bytes (xdr.c) xdr_string (xdr.c)
map_buffers	open_cmc (net_open.c)
map_echelon_number_to_echelon_symbol	sbx_connection_create_unit_msg (sbx.c)
map_echelon_symbol_to_echelon_number	init_mappings (map.c) create_composite (composite.c)
map_echelon_type_number_to_echelon_type_symbol	sbx_connection_create_unit_msg (sbx.c)
map_echelon_type_symbol_to_icon_number	create_composite (composite.c)
map_enp	open_cmc (net_open.c)
map_icon_symbol_to_icon_number	icon_from_object_type (map.c) map_echelon_type_symbol_to_icon_number (map.c)
map_key	tty_setup_parser_break_set (geyer.c)
ap_role_sym_to_role_number	create_targeting (targeting.c)
mat_copy	get_i_and_t_from_normal (impact.c) saf_vehicle_tick (saf_vehicle.c)
mat_ident_init	create_vehicle (vehicle.c)
mat_init	create_missile (missile.c)
mat_mat_mul	create_groundveh (groundveh.c) get_i_and_t_from_normal (impact.c) groundveh_tick (groundveh.c) induce_roll (flyingveh.c) induce_tail_spin (flyingveh.c) tdb_get_hull_to_world (h_to_w.c)
mat_rot_init	create_groundveh (groundveh.c) get_i_and_t_from_normal (impact.c) groundveh_move (groundveh.c) init_static_matrices (flyingveh.c) pilot_start_landed (pilot.c) saf_vehicle_teleport (saf_vehicle.c) tdb_get_hull_to_world (h_to_w.c) vec_z_rotate (math.c)
mat_transpose	tdb_get_hull_to_world (h_to_w.c)
at_vec_mul	get_i_and_t_from_normal (impact.c) get_i_and_t_from_normal (impact.c) turret_point_at_target (turret.c)
match	doit (yp_gnetgr.c)
matchgid	yp_getgrgid (yp_getgrent.c)
matchname	yp_getgrnam (yp_getgrent.c)
matchname	yp_getpwnam (yp_getpwent.c)
matchuid	yp_getpwuid (yp_getpwent.c)
memchr	fgetpwent (ht_getpwent.c)
memcpy	realloc (malloc.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
memory_init	tdb_init_memory (memory.c)
minimum_clip	point_in_building (building_check.c)
	buildings_thru (building_check.c)
	possible_intersection (intersection.c)
missile_deactivate	missile_ground_impact (missile.c)
	missile_maybe_hit_target (missile.c)
missile_ground_impact	fly_missile (missile.c)
missile_maybe_hit_target	fly_missile (missile.c)
missile_send_appearance	fly_missile (missile.c)
	fire_missile_at_target (missile.c)
missile_set_desired_direction	fly_missile (missile.c)
missile_show	weapon_show (weapons.c)
missile_state_to_string	missile_show (missile.c)
mission_stationpoint	saf_vehicle_teleport_to_station (saf_vehicle.c)
mmap	map_buffers (net_stuf.c)
morecore	malloc (malloc.c)
munmap	unmap_buffers (net_stuf.c)
muzzle_position_in_world_coordinates	fire_weapon_at_target (weapons.c)
	fire_missile_at_target (missile.c)
navigator_entered_area	navigator_tick (navigator.c)
navigator_entered_zone	navigator_tick (navigator.c)
navigator_left_area	navigator_tick (navigator.c)
navigator_left_zone	navigator_tick (navigator.c)
navigator_passed_line	navigator_tick (navigator.c)
navigator_passed_point	navigator_tick (navigator.c)
navigator_reset_overlay	navigator_tick (navigator.c)
navigator_set_overlay	composite_readjust_overlay (composite.c)
navigator_show	composite_execute_overlay (composite.c)
navigator_tick	composite_show (composite.c)
need_decluster	composite_tick (composite.c)
net_access	update_clusters (reporter.c)
	do_mode_cmd_cmc (net_mode.c)
	net_add_mca (net_mca.c)
	net_add_type (net_type.c)
	net_alive (net_ctl.c)
	net_del_mca (net_mca.c)
	net_get_parameters (net_open.c)
	net_get_statistics (net_stat.c)
	net_init_mca (net_mca.c)
	net_init_type (net_type.c)
	net_stop (net_run.c)
	net_zero_statistics (net_stat.c)
	open_cmc (net_open.c)
	send_cmc (net_osend.c)
	send_cmc_8023 (net_send.c)
net_add_mca	AssocSubscribeWithMask (subscribe.c)
net_add_type	AssocOpen (open.c)
net_addr_compare	AssocSendAggregate (aggregate.c)
net_alive	open_cmc (net_open.c)
	AssocOpen (open.c)
net_close	AssocClose (close.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
net_current_time	AssocAddTransaction (origin.c) AssocCacheResponse (respondent.c) AssocSendAggregate (aggregate.c) AssocTickAssocLayer (tick.c) AssocTimeOutOldResponses (respondent.c) UpdateTransactions (tick.c) AssocUnsubscribeWithMask (subscribe.c)
net_del_mca	open_cmc (net_open.c)
net_get_parameters	AssocReceivePDU (receive.c)
net_get_rcv	AssocGetLastAddress (who.c)
net_get_rcv_from_addr	AssocProcessRequestPDU (proc_req.c)
net_get_rcv_to_addr	simnet_getstats (simnet.c)
net_get_statistics	AssocOpen (open.c)
net_init_mca	AssocOpen (open.c)
net_init_type	AssocOpen (open.c)
net_norm	AssocOpen (open.c)
net_open	AssocReceivePDU (receive.c)
net_release_rcv	SAF_NET_SND_KLUDGE (simnet.c)
et_send	AssocOpen (open.c)
net_set_snd_from_addr	AssocOpen (open.c)
net_set_snd_type	SAF_NET_SND_KLUDGE (simnet.c)
net_snd	simnet_getstats (simnet.c)
net_stat_string	AssocOpen (open.c)
net_stop	simnet_zerostats (simnet.c)
net_zero_statistics	yp_getnetbyaddr (yp_gnetent.c)
nettoa	_yp_dobind (yp_bind.c)
newborn	remote_next_road_point (remote.c)
next_road_point	parse_servfile (vis.c)
next_serv	z_velocity (pilot.c)
noa_damp	tdb_get_z (elevation.c)
object_include	patch (pve_checkvis.c)
objects	objects (pve_checkvis.c)
obstacle	localtime (ctime.c)
offtime	gmtime (ctime.c)
onminuslist	yp_getgrent (yp_getgrent.c)
onminuslist	yp_getpwent (yp_getpwent.c)
open	access_cmc (net_acce.c) create_bridges (bridges.c) create_buildings (trees.c) create_contours (trees.c) create_lakes (bridges.c) create_river_ints (rivers.c) create_rivers (rivers.c) create_road_ints (roads.c) create_roads (roads.c) create_tree_canopies (trees.c) create_trees (trees.c) fopen (fopen.c) freopen (freopen.c) get_type (net_open.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
open (cont.)	read_quadtree (terrain.c) syslog (syslog.c) tdb_get_db_format (version.c) tdb_get_tdb_info (tdb_init.c) tzload (ctime.c)
open_147	net_open (net_open.c)
open_cmc	net_open (net_open.c)
open_io_connections	read_machine_file (main.c)
open_line_intersection	cm_count_intersections (navigator.c) count_intersections (intersection.c)
openlog	syslog (syslog.c)
or_bitfield	add_into_spotter_table (spotter.c) sbx_set_specific_known_vehicles (sbx.c) sbx_set_top_level_known_vehicles (sbx.c) left_edge (minimum_clip.c)
p2_bottom	p_follower_new_rel_rt_pnt (p_follower.c)
p_follow_form_flip	p_follower_set_desired_vel (p_follower.c)
p_follower_am_i_flying_coord	p_follower_followroute_tick (p_follower.c) p_follower_set_desired_vel (p_follower.c) cm_add_route (cm.c)
p_follower_arrive_at_same_time	p_follower_new_rel_rt_pnt (p_follower.c)
p_follower_comp_reset_route	pilot_followroute_tick (pilot.c)
p_follower_find_pnt_in_turn	p_follower_hoverhold (p_follower.c)
p_follower_flip_in_turn	p_follower_hoverhold_tick (p_follower.c)
p_follower_fly_in_coord_pos	p_follower_landhold_tick (p_follower.c) p_follower_set_desired_vel (p_follower.c) p_follower_followroute_tick (p_follower.c) pilot_follow_leader_tick (p_follower.c) p_follower_flying_independent (p_follower.c) commander_attack (commander.c) p_follower_fly_in_coord_pos (p_follower.c) p_follower_gen_coord_goal_pnt (p_follower.c) p_follower_hoverhold (p_follower.c) p_follower_land (p_follower.c) p_follower_pnt_in_no_turn (p_follower.c) pilot_follow_leader_tick (p_follower.c) p_follower_find_pnt_in_turn (p_follower.c) p_follower_followroute_tick (p_follower.c) p_follower_hoverhold_tick (p_follower.c) pilot_follow_leader_tick (p_follower.c) p_follower_landhold_tick (p_follower.c) pilot_follow_leader_tick (p_follower.c) pilot_gotopoint (pilot.c) p_follower_flying_independent (p_follower.c) p_follower_followroute_tick (p_follower.c) p_follower_flying_independent (p_follower.c) p_follower_followroute_tick (p_follower.c) p_follower_find_pnt_in_turn (p_follower.c) p_follower_find_pnt_in_turn (p_follower.c) p_follower_find_pnt_in_turn (p_follower.c) p_follower_set_desired_vel (p_follower.c) p_follower_followroute_tick (p_follower.c) saf_vehicle_reset_station_keeper (saf_vehicle.c)
p_follower_flying_independent	
p_follower_followroute_tick	
p_follower_gen_coord_goal_pnt	
p_follower_get_wrld_offset	
p_follower_hoverattack_tick	
p_follower_hoverhold	
p_follower_hoverhold_tick	
p_follower_land	
p_follower_landhold_tick	
p_follower_leader_passed_point	
p_follower_new_rel_rt_pnt	
p_follower_passed_point	
p_follower_pnt_in_hard_turn	
p_follower_pnt_in_no_turn	
p_follower_pnt_in_shallow_turn	
p_follower_set_desired_vel	
p_follower_set_follow	



<u>Called Function</u>	<u>Calling Function (filename)</u>
p_follower_stop_coord	p_follower_gen_coord_goal_pnt (p_follower.c)
p_poly_provides_support	p_follower_followroute_tick (p_follower.c)
parse_servfile	find_support (elevation.c)
parser_create	vis_nextserv (vis.c)
parser_init	main (main.c)
parser_restore_term	parser_create (parser.c)
	abort_handler (main.c)
	exit_handler (main.c)
patch	test_maxima (pve_checkvis.c)
perf_monitor_off	set_monitor_period (parser.c)
perf_monitor_on	set_monitor_period (parser.c)
periodic_fncl	open_io_connections (sbx.c)
	parser_create (parser.c)
	start_simnet (simnet.c)
	start_ticking (tickable.c)
perror	map_buffers (net_stuf.c)
	tty_restore_modes (setup.c)
	tty_setup_modes (setup.c)
	unmap_buffers (net_stuf.c)
pflush	perror (perror.c)
	print_chr (perror.c)
	print_str (perror.c)
phase_two_collision_check	detect_imminent_collision_tick (collision.c)
pilot_cancel_immediate	saf_vehicle_resume_mission (saf_vehicle.c)
	pilot_set_route_mis (pilot.c)
pilot_change_altitude_im	commander_change_altitude (commander.c)
	sbx_altitude (sbx.c)
pilot_change_speed_im	saf_vehicle_change_speed (saf_vehicle.c)
pilot_check_state	pilot_tick (pilot.c)
pilot_execute_overlay	saf_vehicle_execute_overlay (saf_vehicle.c)
pilot_executing_immediate_command	saf_vehicle_useless (saf_vehicle.c)
	saf_vehicle_generate_status_report (saf_vehicle.c)
pilot_face_direction	pilot_face_direction_im (pilot.c)
pilot_face_direction_im	saf_vehicle_face_direction (saf_vehicle.c)
pilot_follow_leader	saf_vehicle_set_leader (saf_vehicle.c)
pilot_follow_leader_tick	pilot_tick2 (pilot.c)
pilot_follow_vehicle	pilot_follow_vehicle_im (pilot.c)
pilot_follow_vehicle_im	saf_vehicle_follow_vehicle (saf_vehicle.c)
pilot_followroute_tick	pilot_tick2 (pilot.c)
pilot_get_asm	pilot_follow_leader_tick (p_follower.c)
	commander_attack (commander.c)
pilot_get_speed	attackatwill_tick (pilot.c)
	idle_tick (pilot.c)
	p_follower_arrive_at_same_time (p_follower.c)
	p_follower_flying_independent (p_follower.c)
	p_follower_gen_coord_goal_pnt (p_follower.c)
	p_follower_hoverhold_tick (p_follower.c)
	p_follower_landhold_tick (p_follower.c)
	p_follower_leader_passed_point (p_follower.c)
	p_follower_passed_point (p_follower.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
pilot_get_speed (cont.)	p_follower_set_desired_vel (p_follower.c) pilot_followroute_tick (pilot.c) pilot_hoverattack_tick (pilot.c) pilot_hoverhold_tick (pilot.c) pilot_landhold_tick (pilot.c) pilot_orbit_tick (pilot.c)
pilot_goto_endpoint	pilot_hoverattack_tick (pilot.c) pilot_hoverhold_tick (pilot.c) pilot_landhold_tick (pilot.c)
pilot_goto_point_im	saf_vehicle_goto_point (saf_vehicle.c)
pilot_gotopoint	pilot_hoverattack_tick (pilot.c) pilot_orbit_tick (pilot.c) pilot_followroute_tick (pilot.c)
pilot_hold	pilot_hold_im (pilot.c)
pilot_hold_im	commander_halt (commander.c) sbx_hold (sbx.c)
pilot_hoverattack	pilot_hoverattack_tick (pilot.c)
pilot_hoverattack_complete	pilot_start_hoverattack_complete (pilot.c) pilot_hoverattack_tick (pilot.c)
pilot_hoverattack_im	commander_attack (commander.c) sbx_attack (sbx.c)
pilot_hoverattack_tick	pilot_tick2 (pilot.c)
pilot_hoverhold	pilot_start_hoverhold (pilot.c) pilot_followroute_tick (pilot.c) pilot_hoverhold_tick (pilot.c) pilot_tick2 (pilot.c)
pilot_hoverhold_tick	pilot_set_route_mis (pilot.c)
pilot_init_followroute	pilot_hoverattack_im (pilot.c)
pilot_init_hoverattack	p_follower_hoverhold (p_follower.c)
pilot_init_hoverhold	pilot_face_direction (pilot.c) pilot_followroute_tick (pilot.c) pilot_goto_point_im (pilot.c) pilot_hold (pilot.c)
pilot_init_land	are_we_there (pilot.c) p_follower_land (p_follower.c) pilot_land_im (pilot.c)
pilot_init_orbithold	pilot_hold (pilot.c)
pilot_is_facing_direction	z_velocity (pilot.c) pilot_hoverhold (pilot.c) vehicle_facing_point (pilot.c)
pilot_land_im	commander_land (commander.c) sbx_land (sbx.c)
pilot_landhold_tick	pilot_tick2 (pilot.c)
pilot_landing	idle_tick (pilot.c) pilot_landhold_tick (pilot.c)
pilot_on_same_route	p_follower_followroute_tick (p_follower.c)
pilot_orbit_tick	pilot_follow_leader_tick (p_follower.c) pilot_tick2 (pilot.c)
pilot_orbithold	pilot_orbit_tick (pilot.c)
pilot_point_at_target	point_weapon_at_target (gunner.c)
pilot_remove_vehicles	saf_vehicle_remove_vehicles (saf_vehicle.c)
pilot_set_leader_mis	saf_vehicle_set_leader (saf_vehicle.c)

**Called Function**

pilot\_set\_route\_mis

pilot\_set\_speed\_mis

pilot\_show

pilot\_show\_machine

pilot\_start\_gotopoint

pilot\_start\_hoverattack

pilot\_start\_hoverattack\_approach

pilot\_start\_hoverattack\_complete

pilot\_start\_hoverattack\_egress

pilot\_start\_hoverhold

pilot\_start\_landed

pilot\_start\_landing

pilot\_start\_orbithold

pilot\_start\_takingoff

pilot\_state\_to\_string

ilot\_stationpoint

pilot\_stop\_mission

pilot\_takingoff

pilot\_tick

pilot\_tick2

**Calling Function (filename)**

saf\_vehicle\_set\_route (saf\_vehicle.c)

pilot\_execute\_overlay (pilot.c)

saf\_vehicle\_set\_speed (saf\_vehicle.c)

saf\_vehicle\_show (saf\_vehicle.c)

pilot\_show (pilot.c)

cm\_add\_route (cm.c)

pilot\_followroute\_tick (pilot.c)

pilot\_hoverattack\_tick (pilot.c)

pilot\_hoverhold\_tick (pilot.c)

pilot\_init\_followroute (pilot.c)

pilot\_init\_hoverattack (pilot.c)

pilot\_init\_hoverhold (pilot.c)

pilot\_init\_land (pilot.c)

pilot\_init\_orbithold (pilot.c)

pilot\_landhold\_tick (pilot.c)

pilot\_orbit\_tick (pilot.c)

pilot\_start\_hoverattack\_approach (pilot.c)

pilot\_start\_hoverattack\_egress (pilot.c)

pilot\_start\_takingoff (pilot.c)

pilot\_hoverattack\_tick (pilot.c)

pilot\_hoverattack\_tick (pilot.c)

pilot\_hoverattack\_tick (pilot.c)

pilot\_hoverattack\_tick (pilot.c)

pilot\_init\_hoverhold (pilot.c)

pilot\_hoverhold\_tick (pilot.c)

pilot\_start\_landing (pilot.c)

idle\_tick (pilot.c)

pilot\_landhold\_tick (pilot.c)

idle\_tick (pilot.c)

pilot\_landhold\_tick (pilot.c)

pilot\_orbit\_tick (pilot.c)

p\_follower\_followroute\_tick (p\_follower.c)

p\_follower\_hoverhold\_tick (p\_follower.c)

p\_follower\_landhold\_tick (p\_follower.c)

pilot\_followroute\_tick (pilot.c)

pilot\_hoverattack\_tick (pilot.c)

pilot\_hoverhold\_tick (pilot.c)

pilot\_landhold\_tick (pilot.c)

pilot\_orbit\_tick (pilot.c)

pilot\_show\_machine (pilot.c)

saf\_vehicle\_teleport\_to\_station (saf\_vehicle.c)

saf\_vehicle\_cancel\_overlay (saf\_vehicle.c)

p\_follower\_followroute\_tick (p\_follower.c)

p\_follower\_hoverhold\_tick (p\_follower.c)

p\_follower\_landhold\_tick (p\_follower.c)

pilot\_followroute\_tick (pilot.c)

pilot\_hoverattack\_tick (pilot.c)

pilot\_hoverhold\_tick (pilot.c)

pilot\_landhold\_tick (pilot.c)

pilot\_orbit\_tick (pilot.c)

saf\_vehicle\_tick (saf\_vehicle.c)

pilot\_tick (pilot.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
plane_tick	air_tick (flyingveh.c)
pmap_getport	clntudp_bufcreate (clnt_udp.c)
point_in_building	detect_collision_tick (collision.c)
point_inside_polygon	segment_inside_polygon (intersection.c)
point_weapon_at_target	track_target (gunner.c)
	acquire_target (gunner.c)
poll_request_to_string	sbx_connection_service_poll_msg (sbx.c)
	sbx_connection_show (sbx.c)
polygon_include	p_poly_provides_support (elevation.c)
pop_cis	check_predicates (predicates.c)
pop_resumable_cis	commander_resume_mission (commander.c)
possible_intersection	segment_thru_lake (water_check.c)
	segment_thru_river (water_check.c)
	damage_vehicle_impact (damage.c)
	composite_show (composite.c)
	next_page (more.c)
	print_break_set (breakset.c)
	perror (perror.c)
	print_num (perror.c)
	compute_who_follows_whom (formation.c)
	sbx_connection_create_unit_msg (sbx.c)
	perror (perror.c)
	sbx_connection_process_message (sbx.c)
	collect_perf_stat (perf.c)
	print_reasons_and_clear (parser.c)
	driver_show (driver.c)
	driver_show (driver.c)
	print_route (route.c)
	remote_show (remote.c)
	show_route_points (route.c)
	udp_write (udp_berkeley.c)
print_sockaddr	perror (perror.c)
print_str	print_num (perror.c)
	airveh_show (flyingveh.c)
	driver_show (driver.c)
	entity_show (entity.c)
	pilot_show (pilot.c)
	pilot_show_machine (pilot.c)
	sbx_connection_reset_msg (sbx.c)
	composite_show (composite.c)
	vehicle_show (vehicle.c)
	driver_show (driver.c)
	abort_handler (main.c)
	access_147 (net_acce.c)
	add_vehicle_to_cluster (reporter.c)
	air_tick (flyingveh.c)
	airveh_show (flyingveh.c)
	allocate_safobj (safobj.c)
	AssocOpen (open.c)
	broadcast_appearance_data (sbx.c)
	broadcast_pae_data (sbx.c)
printdirection	
printf	

**Called Function**

printf (cont.)

**Calling Function (filename)**

buf\_rudp\_discard\_all\_buffers (buf\_conn.c)  
 buf\_rudp\_flush (buf\_conn.c)  
 buf\_rudp\_show (buf\_conn.c)  
 buf\_rudp\_tick (buf\_conn.c)  
 buffer\_statistics\_print (queue\_fix.c)  
 choose\_skirt\_point (collision.c)  
 choose\_target\_and\_weapon (targeting.c)  
 cis\_show (cis.c)  
 cluster\_shell (reporter.c)  
 cluster\_vehicle (reporter.c)  
 cm\_add\_area (cm.c)  
 cm\_add\_line (cm.c)  
 cm\_add\_point (cm.c)  
 cm\_add\_route (cm.c)  
 cm\_add\_zone (cm.c)  
 cm\_delete\_cm (cm.c)  
 cm\_delete\_cm\_from\_overlay (cm.c)  
 cm\_delete\_overlay (cm.c)  
 cm\_execute\_overlay (cm.c)  
 collision\_dead\_tick (collision.c)  
 collision\_show (collision.c)  
 collision\_tick (collision.c)  
 commander\_execute\_overlay (commander.c)  
 commander\_show (commander.c)  
 composite\_assume\_formation\_internal (composite.c)  
 composite\_pro\_sim (composite.c)  
 composite\_remove\_inferior\_composite (composite.c)  
 composite\_remove\_inferior\_vehicle (composite.c)  
 composite\_remove\_member\_vehicle (composite.c)  
 composite\_set\_superior (composite.c)  
 composite\_show (composite.c)  
 composite\_tick (composite.c)  
 compute\_who\_follows\_whom (formation.c)  
 cons (list.c)  
 count\_forces (parser.c)  
 count\_hosts (parser.c)  
 count\_sites (parser.c)  
 count\_vehicles (parser.c)  
 countries\_from\_battle\_scheme\_and\_force (parser.c)  
 create\_bridges (bridges.c)  
 create\_buildings (trees.c)  
 create\_contours (trees.c)  
 create\_remote\_vehicle (remote.c)  
 create\_river\_ints (rivers.c)  
 create\_rivers (rivers.c)  
 create\_road\_ints (roads.c)  
 create\_roads (roads.c)  
 create\_targeting (targeting.c)  
 create\_tree\_canopies (trees.c)  
 create\_trees (trees.c)  
 create\_weapon\_systems (weapons.c)

**Called Function**

printf (cont.)

**Calling Function (filename)**

damage\_indirect\_fire (damage.c)  
 damage\_vehicle\_impact (damage.c)  
 damage\_vehicle\_rammed (damage.c)  
 database\_df\_damage\_query (df\_damage.c)  
 database\_if\_damage\_query (if\_damage.c)  
 database\_read (database.c)  
 debugging\_on (main.c)  
 destroy\_cm\_data (cm.c)  
 detect\_building\_on\_path\_tick (collision.c)  
 detect\_collision\_tick (collision.c)  
 detect\_imminent\_collision\_tick (collision.c)  
 detection\_show (detection.c)  
 detection\_show\_type (detection.c)  
 do\_heap\_collect (alloc.c)  
 do\_heap\_statistics (alloc.c)  
 do\_heap\_verify (alloc.c)  
 do\_mode\_cmd (net\_mode.c)  
 do\_mode\_cmd\_147 (net\_mode.c)  
 driver\_execute\_overlay (driver.c)  
 driver\_follow\_leader (driver.c)  
 driver\_follow\_vehicle\_cmd (driver.c)  
 driver\_set\_leader\_mis (driver.c)  
 driver\_show (driver.c)  
 driver\_tick (driver.c)  
 eliminate\_vehicles (saf.c)  
 enable\_predicate (predicates.c)  
 enqueue\_on\_rcvq (simnet.c)  
 entity\_show (entity.c)  
 ethernet\_2\_packets (main.c)  
 execute\_overlay (dispatch.c)  
 fake\_resupply (dispatch.c)  
 fill\_in\_appearance\_data (dispatch.c)  
 fill\_in\_echelon\_data (dispatch.c)  
 fill\_in\_position\_data (dispatch.c)  
 find\_new\_host\_mask (id\_hash.c)  
 fire\_missile\_at\_target (missile.c)  
 fire\_weapon\_at\_target (weapons.c)  
 flush (more.c)  
 fly\_missile (missile.c)  
 fly\_round (weapons.c)  
 followvehicle (driver.c)  
 gasp (main.c)  
 generate\_a\_deactivate (pro\_sim.c)  
 generate\_indirect\_fire\_pkt (pro\_sim.c)  
 generate\_status\_report (dispatch.c)  
 generate\_weapon\_hit (weapons.c)  
 generate\_weapon\_miss (weapons.c)  
 get\_a\_leader (commander.c)  
 get\_control\_measure (cm.c)  
 get\_overlay (cm.c)  
 go\_away (dispatch.c)

**Called Function**

printf (cont.)

**Calling Function (filename)**

groundveh\_tick (groundveh.c)  
 gunner\_tick (gunner.c)  
 host\_loopback\_function (simnet.c)  
 identify\_exercise (parser.c)  
 identify\_version (version.c)  
 init\_mappings (map.c)  
 init\_stuff (main.c)  
 init\_terrain\_stuff (main.c)  
 initialize\_weapon\_priority\_list (weapons.c)  
 intervis\_possibly\_visible (intervis.c)  
 isolate\_connection (main.c)  
 issue\_reports (reporter.c)  
 ivis\_send\_contact\_report (IvisPDU.c)  
 ivis\_send\_shell\_report (IvisPDU.c)  
 ivis\_send\_spot\_report (IvisPDU.c)  
 loader\_tick (loader.c)  
 logistics\_supply\_offer\_received (logistics.c)  
 logistics\_tick (logistics.c)  
 main (main.c)  
 major\_detection\_increase (detection.c)  
 major\_spotter\_increase (spotter.c)  
 make\_me\_non\_blocking (udp\_berkeley.c)  
 map\_key (breakset.c)  
 missile\_ground\_impact (missile.c)  
 missile\_maybe\_hit\_target (missile.c)  
 missile\_show (missile.c)  
 navigator\_entered\_area (navigator.c)  
 navigator\_entered\_zone (navigator.c)  
 navigator\_left\_area (navigator.c)  
 navigator\_left\_zone (navigator.c)  
 navigator\_passed\_line (navigator.c)  
 navigator\_passed\_point (navigator.c)  
 navigator\_show (navigator.c)  
 net\_access (net\_acce.c)  
 net\_current\_time (net\_time.c)  
 net\_get\_rcv (net\_rcv.c)  
 net\_open (net\_open.c)  
 net\_release\_rcv (net\_rcv.c)  
 net\_send (net\_osend.c)  
 net\_snd (net\_send.c)  
 network\_silent (main.c)  
 open\_147 (net\_open.c)  
 p\_follower\_comp\_reset\_route (p\_follower.c)  
 p\_follower\_find\_pnt\_in\_turn (p\_follower.c)  
 p\_follower\_flying\_independent (p\_follower.c)  
 p\_follower\_followroute\_tick (p\_follower.c)  
 p\_follower\_gen\_coord\_goal\_pnt (p\_follower.c)  
 p\_follower\_hoverhold\_tick (p\_follower.c)  
 p\_follower\_land (p\_follower.c)  
 p\_follower\_landhold\_tick (p\_follower.c)  
 p\_follower\_pnt\_in\_hard\_turn (p\_follower.c)

**Called Function**

printf (cont.)

**Calling Function (filename)**

p\_follower\_pnt\_in\_shallow\_turn (p\_follower.c)  
 p\_follower\_stop\_coord (p\_follower.c)  
 parser\_set\_targeting\_parameters (parser.c)  
 pilot\_check\_state (pilot.c)  
 pilot\_execute\_overlay (pilot.c)  
 pilot\_follow\_leader (pilot.c)  
 pilot\_init\_hoverattack (pilot.c)  
 pilot\_init\_land (pilot.c)  
 pilot\_point\_at\_target (pilot.c)  
 pilot\_set\_leader\_mis (pilot.c)  
 pilot\_show (pilot.c)  
 pilot\_show\_machine (pilot.c)  
 pilot\_start\_gotopoint (pilot.c)  
 pilot\_start\_hoverattack (pilot.c)  
 pilot\_start\_hoverattack\_approach (pilot.c)  
 pilot\_start\_hoverattack\_complete (pilot.c)  
 pilot\_start\_hoverattack\_egress (pilot.c)  
 pilot\_start\_hoverhold (pilot.c)  
 pilot\_start\_landing (pilot.c)  
 pilot\_start\_orbithold (pilot.c)  
 pilot\_start\_takingoff (pilot.c)  
 plane\_tick (plane.c)  
 pop\_cis (cis.c)  
 predicates\_show (predicates.c)  
 print\_break\_set (breakset.c)  
 print\_commands\_from\_sbx (main.c)  
 print\_lists (formation.c)  
 print\_message\_position (sbx.c)  
 print\_opfor\_header (sbx.c)  
 print\_perf\_stats (perf.c)  
 print\_reasons (thresh.c)  
 print\_route (route.c)  
 print\_routepoint (route.c)  
 print\_sockaddr (udp\_berkeley.c)  
 print\_vector (math.c)  
 print\_vehicle\_ids (sbx.c)  
 print\_vehicle\_marking (vehicle.c)  
 printdirection (driver.c)  
 printimmediate (driver.c)  
 printmission (driver.c)  
 printroutedirection (driver.c)  
 protocol\_data\_process (simnet.c)  
 protocol\_sim\_process (simnet.c)  
 protocol\_stealth\_process (simnet.c)  
 read\_feature (terrain.c)  
 read\_machine\_file (main.c)  
 read\_quadtree (terrain.c)  
 readjust\_overlay (dispatch.c)  
 remote\_deactivate (remote.c)  
 remote\_show (remote.c)



**Called Function**

printf (cont.)

**Calling Function (filename)**

remote\_tick (remote.c)  
 remove\_clustered\_vehicle (reporter.c)  
 remove\_dead\_clustered\_vehicles (reporter.c)  
 report\_error\_from\_tdb\_once (misc.c)  
 report\_id\_hashing\_statistics (id\_hash.c)  
 reporter\_show (reporter.c)  
 reset\_counters\_etc (more.c)  
 rudp\_ack\_received (rel\_conn.c)  
 rudp\_discard\_all\_buffers (rel\_conn.c)  
 rudp\_disconnect (rel\_conn.c)  
 rudp\_post\_message (rel\_conn.c)  
 rudp\_read\_message (rel\_conn.c)  
 rudp\_retransmit (rel\_conn.c)  
 rudp\_retransmit\_buf (rel\_conn.c)  
 rudp\_send\_bare\_ack (rel\_conn.c)  
 rudp\_show (rel\_conn.c)  
 rudp\_synch (rel\_conn.c)  
 saf\_print\_help (main.c)  
 saf\_vehicle\_fake\_resupply (saf\_vehicle.c)  
 saf\_vehicle\_out\_of\_gas (saf\_vehicle.c)  
 saf\_vehicle\_pro\_sim (saf\_vehicle.c)  
 saf\_vehicle\_set\_leader (saf\_vehicle.c)  
 saf\_vehicle\_set\_superior (saf\_vehicle.c)  
 saf\_vehicle\_show (saf\_vehicle.c)  
 sbx\_add\_area (sbx.c)  
 sbx\_add\_line (sbx.c)  
 sbx\_add\_point (sbx.c)  
 sbx\_add\_route (sbx.c)  
 sbx\_add\_zone (sbx.c)  
 sbx\_altitude (sbx.c)  
 sbx\_attach\_stealth (sbx.c)  
 sbx\_attack (sbx.c)  
 sbx\_change\_formation (sbx.c)  
 sbx\_change\_speed (sbx.c)  
 sbx\_connection\_create\_unit\_msg (sbx.c)  
 sbx\_connection\_exit (sbx.c)  
 sbx\_connection\_generate\_arty\_msg (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_query\_sub\_state (sbx.c)  
 sbx\_connection\_reset\_msg (sbx.c)  
 sbx\_connection\_service\_poll\_msg (sbx.c)  
 sbx\_connection\_set\_ivis\_parameters (sbx.c)  
 sbx\_connection\_set\_ivis\_xmit\_modes (sbx.c)  
 sbx\_connection\_show (sbx.c)  
 sbx\_connection\_show\_top\_level\_units (sbx.c)  
 sbx\_connection\_vehicle\_reinit (sbx.c)  
 sbx\_connection\_write\_buffer (sbx.c)  
 sbx\_delete\_cm (sbx.c)  
 sbx\_delete\_overlay (sbx.c)  
 sbx\_execute\_overlay (sbx.c)  
 sbx\_face\_direction (sbx.c)

**Called Function**

printf (cont.)

**Calling Function (filename)**

sbx\_follow\_vehicle (sbx.c)  
 sbx\_goto\_point (sbx.c)  
 sbx\_halt (sbx.c)  
 sbx\_hold (sbx.c)  
 sbx\_land (sbx.c)  
 sbx\_rejoin\_unit (sbx.c)  
 sbx\_resume\_mission (sbx.c)  
 sbx\_resupply (sbx.c)  
 sbx\_set\_specific\_known\_vehicles (sbx.c)  
 sbx\_set\_targeting\_parameters (sbx.c)  
 sbx\_set\_top\_level\_known\_vehicles (sbx.c)  
 sbx\_simulator\_in\_command (sbx.c)  
 send\_147 (net\_osend.c)  
 send\_147\_8023 (net\_send.c)  
 send\_contact\_report (reporter.c)  
 send\_shelling\_report (reporter.c)  
 send\_spot\_report (reporter.c)  
 set\_exercise\_id (main.c)  
 set\_ground\_impact\_mode (parser.c)  
 set\_indirect\_fire\_mode (parser.c)  
 set\_monitor\_period (parser.c)  
 set\_targeting\_parameters (dispatch.c)  
 set\_tdb\_to\_cache (main.c)  
 set\_terrain\_dbase (main.c)  
 show (dispatch.c)  
 show\_applies\_to (cm.c)  
 show\_area\_cm (cm.c)  
 show\_control\_measure (cm.c)  
 show\_control\_measures (cm.c)  
 show\_df\_damage\_entry (df\_damage.c)  
 show\_if\_damage\_entry (if\_damage.c)  
 show\_line\_cm (cm.c)  
 show\_overlay (cm.c)  
 show\_overlays\_all\_sbx (sbx.c)  
 show\_point\_cm (cm.c)  
 show\_point\_list (cm.c)  
 show\_removed\_vehicles (reporter.c)  
 show\_route (route.c)  
 show\_shelling\_clusters (reporter.c)  
 show\_vehicle (parser.c)  
 show\_vehicle\_cluster (reporter.c)  
 show\_vehicle\_id\_list (reporter.c)  
 show\_vehicle\_ids (parser.c)  
 show\_zone\_cm (cm.c)  
 sigh (main.c)  
 simnet\_60\_constants (main.c)  
 simnet\_getstats (simnet.c)  
 simnet\_id\_from\_saf\_id (id\_hash.c)  
 simnet\_send\_appearance (SimulationPDU.c)  
 simnet\_send\_collision (SimulationPDU.c)  
 simnet\_send\_deactivate (SimulationPDU.c)

**Called Function****Calling Function (filename)**

printf (cont.)

simnet\_send\_fire (SimulationPDU.c)  
 simnet\_send\_impact (SimulationPDU.c)  
 simnet\_send\_indirect\_fire (SimulationPDU.c)  
 simnet\_send\_radiate (SimulationPDU.c)  
 simnet\_send\_resupply\_cancel (SimulationPDU.c)  
 simnet\_send\_resupply\_received (SimulationPDU.c)  
 simnet\_send\_resupply\_request (SimulationPDU.c)  
 simnet\_tick (simnet.c)  
 spotter\_show (spotter.c)  
 spotter\_show\_table (spotter.c)  
 start\_avoiding\_house (collision.c)  
 start\_resupply\_of\_to (logistics.c)  
 start\_simnet (simnet.c)  
 stealth\_attach\_to (parser.c)  
 stealth\_teleport\_to (parser.c)  
 targeting\_set\_parameters (targeting.c)  
 targeting\_show (targeting.c)  
 targeting\_tick (targeting.c)  
 tty\_invoke\_fcn\_on\_char (breakset.c)  
 tty\_restore\_modes (setup.c)  
 tty\_setup\_modes (setup.c)  
 turret\_scan (turret.c)  
 turret\_show (turret.c)  
 turret\_slew (turret.c)  
 udp\_open (udp\_berkeley.c)  
 udp\_read (udp\_berkeley.c)  
 udp\_write (udp\_berkeley.c)  
 update\_clusters (reporter.c)  
 update\_target\_list (targeting.c)  
 vehicle\_defuel (parser.c)  
 vehicle\_fake\_resupply (parser.c)  
 vehicle\_kill (pro\_sim.c)  
 vehicle\_manager\_print (iterator.c)  
 vehicle\_reappeared (reporter.c)  
 vehicle\_resupply (parser.c)  
 vehicle\_show (vehicle.c)  
 weapon\_deselect (weapons.c)  
 weapon\_load (weapons.c)  
 weapon\_priority\_list\_show (weapons.c)  
 weapon\_select (weapons.c)  
 weapon\_show (weapons.c)  
 weapon\_systems\_show (weapons.c)  
 weapon\_unload (weapons.c)  
 write\_string\_to\_tty (more.c)  
 yylex (lexer.c)  
 driver\_show (driver.c)  
 driver\_show (driver.c)  
 driver\_show (driver.c)  
 main (main.c)  
 pilot\_init\_hoverattack (pilot.c)

printimmediate  
 printmission  
 printroutedirection  
 proc\_switches  
 project\_point

<u>Called Function</u>	<u>Calling Function (filename)</u>
protocol_data_process	host_loopback_function (simnet.c) simnet_tick (simnet.c)
protocol_sim_process	host_loopback_function (simnet.c) simnet_tick (simnet.c)
protocol_stealth_process	simnet_tick (simnet.c)
push	buildings_thru (building_check.c) get_building_indecies (building_check.c) get_quad_nodes_internal (search.c) get_water_indecies (water_check.c)
push_cis	activate_new_cis (cis.c) check_predicates (predicates.c)
utlong	res_mkquery (res_mkquery.c)
putshort	res_mkquery (res_mkquery.c)
pve_checkvis	intervis_get_high_ground (intervis.c) intervis_pt_to_pt (intervis.c) intervis_possibly_visible (intervis.c)
pwskip	_shadow (ht_getpwent.c)
pwskip	interpret (yp_getpwent.c)
qsort	sort_form_db (formation.c) sort_tag_table (tags.c) update_target_list (targeting.c)
qst	qsort (qsort.c) qst (qsort.c)
queue_allocate	rudp_init (rel_conn.c) buf_rudp_init (buf_conn.c)
queue_dequeue	buffer_dequeue (queue_fix.c)
queue_enqueue	buffer_enqueue (queue_fix.c)
queue_flush	buffer_flush (queue_fix.c)
queue_flush_hangers	queue_flush_hangers (queue_fix.c) queue_flush (queue_fix.c)
queue_length	buf_rudp_show (buf_conn.c) buf_rudp_tick (buf_conn.c) rudp_ack_received (rel_conn.c) rudp_post_message (rel_conn.c) rudp_show (rel_conn.c) sbx_connection_overloaded (sbx.c)
adiate_target	track_target (gunner.c)
rand	get_me_a_random_fraction (random.c)
randomize_vector	get_i_and_t_from_normal (impact.c)
range_squared	choose_target_and_weapon (targeting.c) damage_indirect_fire (damage.c) fly_missile (missile.c) generate_weapon_hit (weapons.c) generate_weapon_miss (weapons.c)
	logistics_tick (logistics.c) missile_maybe_hit_target (missile.c) shoot_target (gunner.c) target_in_position (targeting.c) update_target_list (targeting.c)
rassoc_sym	map_echelon_type_number_to_echelon_type_symbol (map.c) map_echelon_number_to_echelon_symbol (map.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
re_assign_routepoints	cm_add_route (cm.c)
read	_filbuf (filbuf.c)
	create_bridges (bridges.c)
	create_buildings (trees.c)
	create_contours (trees.c)
	create_lakes (bridges.c)
	create_river_ints (rivers.c)
	create_rivers (rivers.c)
	create_road_ints (roads.c)
	create_roads (roads.c)
	create_tree_canopies (trees.c)
	create_trees (trees.c)
	init_patch_indices (cache_init.c)
	memory_init (memory.c)
	read_feature (terrain.c)
	read_quadtree (terrain.c)
	res_send (res_send.c)
	tdb_get_db_format (version.c)
	tdb_init_patch_guards (cache_init.c)
	.db_read_header (header.c)
	terrain_cache_inquire (cache_query.c)
	tzload (ctime.c)
read_feature	read_quadtree (terrain.c)
read_machine_file	init_stuff (main.c)
read_quadtree	read_quadtree_database (terrain.c)
read_quadtree_database	init_terrain_stuff (main.c)
read_terrain_files	read_quadtree_database (terrain.c)
reader_read_file	database_init (main.c)
	database_read (database.c)
	init_mappings (map.c)
	read_machine_file (main.c)
readjust_overlay	cm_force_overlay_recalculation (cm.c)
realloc	ht_fgetgrent (ht_getgrent.c)
recv	res_send (res_send.c)
recvfrom	udp_read (udp_berkeley.c)
	clntudp_call (clnt_udp.c)
	_seterr_reply (rpc_prot.c)
rejected	sbx_attach_stealth (sbx.c)
remote_change_stealth_controlling_port	remote_tick (remote.c)
remote_deactivate	fill_in_appearance_data (dispatch.c)
remote_fill_in_appearance_data	fill_in_echelon_data (dispatch.c)
remote_fill_in_echelon_data	fill_in_position_data (dispatch.c)
remote_fill_in_position_data	go_away (dispatch.c)
remote_go_away	create_remote_vehicle (remote.c)
remote_init_vars	protocol_sim_process (simnet.c)
remote_new_appearance	protocol_stealth_process (simnet.c)
	get_leader_state (driver.c)
remote_next_road_point	show (dispatch.c)
remote_show	remote_next_road_point (remote.c)
remote_start_being_watched	create_remote_vehicle (remote.c)
remote_start_ticking	remote_tick (remote.c)
remote_stop_being_watched	

<u>Called Function</u>	<u>Calling Function (filename)</u>
remove_clustered_vehicle	update_reporter_vehicles (reporter.c)
remove_dead_clustered_vehicles	reporter_remove_vehicles (reporter.c)
remove_duplicates	update_clusters (reporter.c)
remove_executing_unit	get_building_indecies (building_check.c)
remove_function	get_water_indecies (water_check.c)
remove_grid_entry	cm_execute_overlay (cm.c)
remove_removed_vehicle	change_fncl_period (fncl.c)
remove_shelling_cluster	cancel_fncl (fncl.c)
remove_vehicles	update_grid_entry_list (iterator.c)
report_cluster_vehicle_type	destroy_grid_entry_list (iterator.c)
report_error_from_tdb_once	vehicle_reappeared (reporter.c)
	issue_reports (reporter.c)
	remote_deactivate (remote.c)
	eliminate_vehicles (saf.c)
	send_spot_report (reporter.c)
	send_contact_report (reporter.c)
	get_soil_type (misc.c)
	groundveh_move (groundveh.c)
	pilot_start_landed (pilot.c)
	saf_vehicle_teleport (saf_vehicle.c)
	tdb_get_gl (misc.c)
	tdb_get_zl (misc.c)
report_hit	check_hits (pve_checkvis.c)
report_ivis_network	send_shelling_report (reporter.c)
	send_spot_report (reporter.c)
	send_contact_report (reporter.c)
report_last_hit	pve_checkvis (pve_checkvis.c)
report_tree_block	check_tree_hit (pve_checkvis.c)
reporter_remove_vehicles	composite_remove_vehicles (composite.c)
reporter_show	composite_show (composite.c)
reporter_tick	composite_tick (composite.c)
res_init	res_mkquery (res_mkquery.c)
	res_query (res_query.c)
	res_search (res_query.c)
	res_send (res_send.c)
res_mkquery	res_query (res_query.c)
res_query	dns_gethostbyaddr (dns_getnamadr.c)
	res_search (res_query.c)
	res_querydomain (res_query.c)
res_querydomain	res_search (res_query.c)
res_search	dns_gethostbyname (dns_getnamadr.c)
res_send	res_query (res_query.c)
reset_counters_etc	flush (more.c)
reset_predicates	print_break_set (breakset.c)
	adjust_behaviors (cis.c)
	create_predicates (predicates.c)
resupply_check_ok	logistics_tick (logistics.c)
resupply_bld_amm0_needs	choose_resupply_item (logistics.c)
	logistics_tick (logistics.c)
rewind	yp_setnetent (yp_gnetent.c)
rindex	nettoa (yp_gnetent.c)
rotate_queue	terrain_cache_inquire (cache_query.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
routepoint_distance	append_routepoint (route.c)
rpc_perror	xdr_bytes (xdr.c)
	xdr_string (xdr.c)
rdp_ack_received	rdp_read_message (rel_conn.c)
rdp_close	buf_rdp_close (buf_conn.c)
rdp_discard_all_buffers	rdp_disconnect (rel_conn.c)
	rdp_synch (rel_conn.c)
rdp_disconnect	buf_rdp_disconnect (buf_conn.c)
rdp_init	buf_rdp_init (buf_conn.c)
rdp_open	buf_rdp_open (buf_conn.c)
rdp_post_message	buf_rdp_flush (buf_conn.c)
rdp_read_message	buf_rdp_read_message (buf_conn.c)
rdp_retransmit	rdp_tick (rel_conn.c)
rdp_send	rdp_retransmit_buf (rel_conn.c)
	rdp_post_message (rel_conn.c)
	rdp_send_bare_ack (rel_conn.c)
	rdp_retransmit (rel_conn.c)
rdp_send_bare_ack	buf_rdp_show (buf_conn.c)
rdp_show	rdp_read_message (rel_conn.c)
rdp_synch	buf_rdp_tick (buf_conn.c)
rdp_tick	saf_exit (main.c)
saf_complete_reset	parser_global_reset (parser.c)
	collision_vehicle_rammed (collision.c)
saf_id_from_simnet_id	damage_indirect_fire (damage.c)
	damage_vehicle_impact (damage.c)
	damage_vehicle_rammed (damage.c)
	interesting_packet_test (simnet.c)
	logistics_supply_offer_received (logistics.c)
	report_id_hashing_statistics (id_hash.c)
	sbx_connection_process_ground_impact (sbx.c)
	sbx_connection_process_vehicle_impact (sbx.c)
saf_reset_for_workstation	sbx_connection_reset_msg (sbx.c)
saf_vehicle_cancel_overlay	commander_cancel_overlay (commander.c)
	saf_vehicle_rejoin_unit (saf_vehicle.c)
saf_vehicle_catastrophic_kill	air_tick (flyingveh.c)
	damage_indirect_fire (damage.c)
	damage_vehicle_impact (damage.c)
	saf_vehicle_mobility_kill (saf_vehicle.c)
	saf_vehicle_reinit (saf_vehicle.c)
	vehicle_kill (pro_sim.c)
saf_vehicle_change_speed	commander_change_speed (commander.c)
	sbx_change_speed (sbx.c)
saf_vehicle_checkpoint_state	sbx_connection_wat_pulse (sbx.c)
saf_vehicle_collision_over	collision_tick (collision.c)
saf_vehicle_doing_collision_stuff	followvehicle (driver.c)
saf_vehicle_est_position	fly_missile (missile.c)
	p_follower_followroute_tick (p_follower.c)
	p_follower_hoverhold (p_follower.c)
	p_follower_hoverhold_tick (p_follower.c)
	p_follower_landhold_tick (p_follower.c)
	shoot_target (gunner.c)
saf_vehicle_execute_overlay	execute_overlay (dispatch.c)

**Called Function****Calling Function (filename)**

saf\_vehicle\_face\_direction

commander\_face\_direction (commander.c)

saf\_vehicle\_fake\_resupply

sbx\_face\_direction (sbx.c)

pilot\_start\_landed (pilot.c)

composite\_fake\_resupply (composite.c)

fake\_resupply (dispatch.c)

saf\_vehicle\_fill\_in\_appearance\_data

fill\_in\_appearance\_data (dispatch.c)

saf\_vehicle\_fill\_in\_echelon\_data

fill\_in\_echelon\_data (dispatch.c)

saf\_vehicle\_fill\_in\_position\_data

fill\_in\_position\_data (dispatch.c)

saf\_vehicle\_firepower\_kill

damage\_indirect\_fire (damage.c)

damage\_vehicle\_impact (damage.c)

saf\_vehicle\_reinit (saf\_vehicle.c)

saf\_vehicle\_follow\_vehicle

commander\_follow\_vehicle (commander.c)

sbx\_follow\_vehicle (sbx.c)

saf\_vehicle\_generate\_status\_report

generate\_status\_report (dispatch.c)

saf\_vehicle\_go\_away

go\_away (dispatch.c)

saf\_vehicle\_goto\_point

commander\_goto\_point (commander.c)

sbx\_goto\_point (sbx.c)

saf\_vehicle\_halt

commander\_halt (commander.c)

collision\_tick (collision.c)

sbx\_halt (sbx.c)

saf\_vehicle\_indirect\_fire

saf\_vehicle\_pro\_sim (saf\_vehicle.c)

saf\_vehicle\_mimic\_vehicle

commander\_restore\_leader\_state (commander.c)

commander\_simulator\_in\_command (commander.c)

saf\_vehicle\_mobility\_kill

damage\_indirect\_fire (damage.c)

damage\_vehicle\_impact (damage.c)

damage\_vehicle\_rammed (damage.c)

saf\_vehicle\_reinit (saf\_vehicle.c)

saf\_vehicle\_next\_event\_id

detect\_collision\_tick (collision.c)

fire\_weapon\_at\_target (weapons.c)

fire\_missile\_at\_target (missile.c)

saf\_vehicle\_out\_of\_gas

saf\_vehicle\_tick (saf\_vehicle.c)

saf\_vehicle\_pro\_sim

saf\_vehicle\_tick (saf\_vehicle.c)

saf\_vehicle\_reinit

sbx\_connection\_vehicle\_reinit (sbx.c)

saf\_vehicle\_rejoin\_unit

sbx\_rejoin\_unit (sbx.c)

saf\_vehicle\_remove\_vehicles

remove\_vehicles (dispatch.c)

saf\_vehicle\_reset\_station\_keeper

commander\_execute\_overlay (commander.c)

commander\_face\_direction (commander.c)

commander\_follow\_vehicle (commander.c)

commander\_goto\_point (commander.c)

commander\_halt (commander.c)

commander\_land (commander.c)

commander\_simulator\_in\_command (commander.c)

saf\_vehicle\_resume\_mission

commander\_resume\_mission (commander.c)

sbx\_resume\_mission (sbx.c)

saf\_vehicle\_send\_appearance

saf\_vehicle\_tick (saf\_vehicle.c)

saf\_vehicle\_set\_direction

commander\_set\_mission\_direction (commander.c)

saf\_vehicle\_set\_leader

composite\_assume\_formation\_internal (composite.c)

saf\_vehicle\_set\_marking

create\_saf\_vehicle (saf\_vehicle.c)

saf\_vehicle\_set\_route

commander\_execute\_overlay (commander.c)

saf\_vehicle\_set\_speed

commander\_set\_mission\_speed (commander.c)

saf\_vehicle\_set\_superior

create\_unit (create.c)



**Called Function****Calling Function (filename)**

saf\_vehicle\_set\_targeting\_parameters

composite\_set\_targeting\_parameters (composite.c)

saf\_vehicle\_show

set\_targeting\_parameters (dispatch.c)

saf\_vehicle\_simulator\_in\_command

show (dispatch.c)

saf\_vehicle\_start\_ticking

collision\_tick (collision.c)

saf\_vehicle\_stop\_mimicing

create\_unit (create.c)

commander\_face\_direction (commander.c)

commander\_follow\_vehicle (commander.c)

commander\_goto\_point (commander.c)

commander\_halt (commander.c)

commander\_restore\_leader\_state (commander.c)

commander\_resume\_mission (commander.c)

saf\_vehicle\_sudden\_stop

start\_disengaging (collision.c)

collision\_tick (collision.c)

saf\_vehicle\_teleport

saf\_vehicle\_teleport\_to\_station (saf\_vehicle.c)

create\_saf\_vehicle (saf\_vehicle.c)

saf\_vehicle\_teleport\_to\_station

composite\_teleport\_to\_station (composite.c)

saf\_vehicle\_useless

commander\_attack (commander.c)

commander\_change\_altitude (commander.c)

commander\_change\_speed (commander.c)

commander\_execute\_overlay (commander.c)

commander\_face\_direction (commander.c)

commander\_follow\_vehicle (commander.c)

commander\_get\_mission\_status (commander.c)

commander\_goto\_point (commander.c)

commander\_halt (commander.c)

commander\_land (commander.c)

commander\_resume\_mission (commander.c)

commander\_simulator\_in\_command (commander.c)

saf\_vehicle\_vehicle\_impact

get\_station\_info (formation.c)

saf\_vehicle\_vehicle\_rammed

saf\_vehicle\_pro\_sim (saf\_vehicle.c)

saf\_vehicle\_pro\_sim (saf\_vehicle.c)

save

yp\_getgrent (yp\_getgrent.c)

save

yp\_getpwent (yp\_getpwent.c)

sbrk

morecore (malloc.c)

malloc (malloc.c)

bx\_add\_area

sbx\_connection\_process\_message (sbx.c)

sbx\_add\_line

sbx\_connection\_process\_message (sbx.c)

sbx\_add\_point

sbx\_connection\_process\_message (sbx.c)

sbx\_add\_route

sbx\_connection\_process\_message (sbx.c)

sbx\_add\_zone

sbx\_connection\_process\_message (sbx.c)

sbx\_altitude

sbx\_connection\_process\_message (sbx.c)

sbx\_attach\_stealth

sbx\_connection\_process\_message (sbx.c)

sbx\_attack

sbx\_connection\_process\_message (sbx.c)

sbx\_change\_formation

sbx\_connection\_process\_message (sbx.c)

sbx\_change\_speed

sbx\_connection\_process\_message (sbx.c)

sbx\_connection\_create\_unit\_msg

sbx\_connection\_process\_message (sbx.c)

sbx\_connection\_disconnect

sbx\_connection\_process\_message (sbx.c)

sbx\_connection\_exit

exit\_all\_sbx\_conns (sbx.c)

sbx\_connection\_generate\_artty\_msg

sbx\_connection\_process\_message (sbx.c)

sbx\_connection\_init

open\_io\_connections (sbx.c)

sbx\_connection\_open

open\_io\_connections (sbx.c)

**Called Function**

sbx\_connection\_overloaded

sbx\_connection\_process\_ground\_impact  
 sbx\_connection\_process\_indirect\_fire  
 sbx\_connection\_process\_message  
 sbx\_connection\_process\_messages  
 sbx\_connection\_process\_vehicle\_impact  
 sbx\_connection\_query\_sub\_state  
 sbx\_connection\_reset\_msg  
 sbx\_connection\_send\_to\_port

sbx\_connection\_service\_poll\_msg  
 sbx\_connection\_set\_iwis\_parameters  
 sbx\_connection\_set\_iwis\_xmit\_modes  
 sbx\_connection\_show  
 sbx\_connection\_show\_top\_level\_units  
 sbx\_connection\_synch\_received  
 sbx\_connection\_vehicle\_reinit  
 sbx\_connection\_write\_buffer

sbx\_delete\_cm  
 sbx\_delete\_overlay  
 sbx\_execute\_overlay  
 sbx\_face\_direction  
 sbx\_follow\_vehicle  
 sbx\_goto\_point  
 sbx\_halt  
 sbx\_hold  
 sbx\_land  
 sbx\_printf

**Calling Function (filename)**

sbx\_connection\_wat\_pulse (sbx.c)  
 sbx\_connection\_stat\_pulse (sbx.c)  
 ground\_impact\_to\_sbx (sbx.c)  
 indirect\_fire\_to\_sbx (sbx.c)  
 sbx\_connection\_process\_messages (sbx.c)  
 sbx\_connection\_tick (sbx.c)  
 vehicle\_impact\_to\_sbx (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 activate\_new\_cis (cis.c)  
 change\_movement\_and\_report (cis.c)  
 composite\_generate\_status\_report (composite.c)  
 remote\_tick (remote.c)  
 saf\_vehicle\_checkpoint\_state (saf\_vehicle.c)  
 saf\_vehicle\_generate\_status\_report (saf\_vehicle.c)  
 sbx\_printf (sbx.c)  
 send\_contact\_report (reporter.c)  
 send\_shelling\_report (reporter.c)  
 send\_spot\_report (reporter.c)  
 send\_stealth\_gone\_msg (remote.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 show\_connection\_all\_sbx (sbx.c)  
 sbx\_connection\_show (sbx.c)  
 sbx\_connection\_tick (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_process\_ground\_impact (sbx.c)  
 sbx\_connection\_process\_indirect\_fire (sbx.c)  
 sbx\_connection\_process\_vehicle\_impact (sbx.c)  
 sbx\_connection\_reset\_msg (sbx.c)  
 sbx\_connection\_send\_to\_port (sbx.c)  
 sbx\_connection\_stat\_pulse (sbx.c)  
 sbx\_connection\_synch\_received (sbx.c)  
 sbx\_connection\_wat\_pulse (sbx.c)  
 write\_buffer\_all\_sbx (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 collision\_tick (collision.c)  
 composite\_send\_unit\_strength\_message (composite.c)  
 logistics\_tick (logistics.c)  
 parser\_send\_string (parser.c)  
 remote\_change\_stealth\_controlling\_port (remote.c)  
 remote\_deactivate (remote.c)

**Called Function**

sbx\_printf (cont.)

sbx\_rejoin\_unit  
 sbx\_resume\_mission  
 sbx\_resupply  
 sbx\_set\_all\_known\_vehicles  
 sbx\_set\_specific\_known\_vehicles  
 sbx\_set\_targeting\_parameters  
 sbx\_set\_top\_level\_known\_vehicles  
 sbx\_simulator\_in\_command  
 sbx\_swap\_known\_vehicles

scan\_weapon  
 scheduler\_init  
 seg\_intersection

segment\_inside\_polygon  
 segment\_thru\_lake  
 segment\_thru\_river  
 select

select\_weapon\_priority\_list  
 send

send\_147  
 send\_147\_8023  
 send\_cmc  
 send\_cmc\_8023  
 send\_contact\_report  
 send\_shelling\_report  
 send\_spot\_report  
 send\_stealth\_gone\_msg

sendto

set\_bit

set\_bitfield

set\_critical\_performance\_level  
 set\_pv\_params

set\_speed\_dir  
 set\_symbol\_value  
 set\_targeting\_parameters

setbit  
 setbuf

**Calling Function (filename)**

resupply\_check\_ok (logistics.c)  
 saf\_vehicle\_generate\_status\_report (saf\_vehicle.c)  
 sbx\_simulator\_in\_command (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_service\_poll\_msg (sbx.c)  
 sbx\_connection\_service\_poll\_msg (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_connection\_service\_poll\_msg (sbx.c)  
 sbx\_connection\_process\_message (sbx.c)  
 sbx\_set\_specific\_known\_vehicles (sbx.c)  
 sbx\_set\_top\_level\_known\_vehicles (sbx.c)  
 gunner\_tick (gunner.c)  
 init\_stuff (main.c)  
 segment\_thru\_lake (water\_check.c)  
 segment\_thru\_river (water\_check.c)  
 segment\_thru\_lake (water\_check.c)  
 water\_check (water\_check.c)  
 water\_check (water\_check.c)  
 res\_send (res\_send.c)  
 clntudp\_call (clnt\_udp.c)  
 choose\_target\_and\_weapon (targeting.c)  
 syslog (syslog.c)  
 res\_send (res\_send.c)  
 net\_send (net\_osend.c)  
 net\_snd (net\_send.c)  
 net\_send (net\_osend.c)  
 net\_snd (net\_send.c)  
 issue\_reports (reporter.c)  
 issue\_reports (reporter.c)  
 issue\_reports (reporter.c)  
 remote\_deactivate (remote.c)  
 remote\_change\_stealth\_controlling\_port (remote.c)  
 clntudp\_call (clnt\_udp.c)  
 res\_send (res\_send.c)  
 udp\_write (udp\_berkeley.c)  
 sbx\_set\_specific\_known\_vehicles (sbx.c)  
 sbx\_set\_top\_level\_known\_vehicles (sbx.c)  
 spotter\_tick (spotter.c)  
 sbx\_set\_all\_known\_vehicles (sbx.c)  
 sbx\_set\_top\_level\_known\_vehicles (sbx.c)  
 init\_stuff (main.c)  
 intervis\_get\_high\_ground (intervis.c)  
 intervis\_pt\_to\_pt (intervis.c)  
 intervis\_possibly\_visible (intervis.c)  
 followvehicle (driver.c)  
 yyparse (parser.y)  
 sbx\_set\_targeting\_parameters (sbx.c)  
 parser\_set\_targeting\_parameters (parser.c)  
 dbm\_store (ndbm.c)  
 tty\_setup\_modes (setup.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
setgrjunk	yp_getgrnam (yp_getgrent.c)
setitimer	alarm (alarm.c)
	sleep (sleep.c)
setnetgrent	yp_getpwent (yp_getpwent.c)
shell_report_needed	issue_reports (reporter.c)
shell_type_to_string	show_shelling_clusters (reporter.c)
shoot_target	gunner_tick (gunner.c)
show	show_vehicle (parser.c)
show_applies_to	show_control_measure (cm.c)
show_area_cm	show_control_measure (cm.c)
show_connection_all_sbx	show_connection (parser.c)
show_control_measure	show_control_measures (cm.c)
show_control_measures	show_overlay (cm.c)
	navigator_show (navigator.c)
show_df_damage_entry	database_df_damage_query (df_damage.c)
show_if_damage_entry	database_if_damage_query (if_damage.c)
show_line_cm	show_control_measure (cm.c)
show_overlay	show_overlays (cm.c)
show_overlays	show_overlays_all_sbx (sbx.c)
show_overlays_all_sbx	show_sbx_overlays (parser.c)
show_point_cm	show_control_measure (cm.c)
show_point_list	show_line_cm (cm.c)
	show_zone_cm (cm.c)
	show_area_cm (cm.c)
show_removed_vehicles	reporter_show (reporter.c)
show_route	show_control_measure (cm.c)
show_route_points	show_route (route.c)
show_shelling_clusters	reporter_show (reporter.c)
show_vehicle_cluster	show_vehicle_clusters (reporter.c)
show_vehicle_clusters	reporter_show (reporter.c)
show_vehicle_id_list	show_overlay (cm.c)
	show_vehicle_cluster (reporter.c)
show_zone_cm	show_control_measure (cm.c)
sigblock	sleep (sleep.c)
	syslog (syslog.c)
signal	main (main.c)
	syslog (syslog.c)
sigpause	sleep (sleep.c)
sigsetmask	sleep (sleep.c)
	syslog (syslog.c)
sigvec	signal (signal.c)
	sleep (sleep.c)
simnet_exit	abort_handler (main.c)
	start_simnet (simnet.c)
	exit_handler (main.c)
simnet_id_from_saf_id	sbx_attach_stealth (sbx.c)
	simnet_id_string_from_saf_id (id_hash.c)
	simnet_send_appearance (SimulationPDU.c)
	simnet_send_collision (SimulationPDU.c)
	simnet_send_deactivate (SimulationPDU.c)

**Called Function****Calling Function (filename)**

simnet\_id\_from\_saf\_id (cont.)

simnet\_send\_fire (SimulationPDU.c)  
 simnet\_send\_impact (SimulationPDU.c)  
 simnet\_send\_indirect\_fire (SimulationPDU.c)  
 simnet\_send\_radiate (SimulationPDU.c)  
 simnet\_send\_resupply\_cancel (SimulationPDU.c)  
 simnet\_send\_resupply\_received (SimulationPDU.c)  
 simnet\_send\_resupply\_request (SimulationPDU.c)  
 simnet\_send\_status\_change (DataCollectionPDU.c)  
 stealth\_send\_attach\_to\_vehicle (StealthPDU.c)  
 vehicle\_manager\_count\_hosts (iterator.c)  
 vehicle\_manager\_count\_sites (iterator.c)

simnet\_id\_string\_from\_saf\_id

missile\_show (missile.c)  
 protocol\_sim\_process (simnet.c)  
 protocol\_stealth\_process (simnet.c)  
 vehicle\_show (vehicle.c)

simnet\_send\_appearance

missile\_send\_appearance (missile.c)  
 saf\_vehicle\_send\_appearance (saf\_vehicle.c)

simnet\_send\_collision

detect\_collision\_tick (collision.c)

simnet\_send\_deactivate

saf\_vehicle\_mimic\_vehicle (saf\_vehicle.c)

missile\_deactivate (missile.c)

simnet\_send\_fire

generate\_a\_deactivate (pro\_sim.c)

fire\_weapon\_at\_target (weapons.c)

fire\_missile\_at\_target (missile.c)

simnet\_send\_impact

generate\_weapon\_hit (weapons.c)

generate\_weapon\_miss (weapons.c)

missile\_ground\_impact (missile.c)

missile\_maybe\_hit\_target (missile.c)

vehicle\_kill\_remote (pro\_sim.c)

vehicle\_ping (pro\_sim.c)

simnet\_send\_indirect\_fire

generate\_indirect\_fire\_pkt (pro\_sim.c)

simnet\_send\_radiate

radiate\_target (weapons.c)

simnet\_send\_resupply\_cancel

logistics\_tick (logistics.c)

simnet\_send\_resupply\_received

logistics\_tick (logistics.c)

simnet\_send\_resupply\_request

logistics\_tick (logistics.c)

simnet\_send\_status\_change

damage\_indirect\_fire (damage.c)

damage\_vehicle\_impact (damage.c)

damage\_vehicle\_rammed (damage.c)

imnet\_zerostats

start\_simnet (simnet.c)

simple\_queue\_allocate

create\_entity (entity.c)

buffer\_pool\_allocate (bufpool.c)

simple\_queue\_deallocate

destroy\_entity (entity.c)

simple\_queue\_dequeue

buffer\_simple\_dequeue (bufpool.c)

buffer\_allocate\_from\_pool (bufpool.c)

simple\_queue\_enqueue

buffer\_pool\_return\_buffer (bufpool.c)

buffer\_simple\_enqueue (bufpool.c)

sin

create\_entity (entity.c)

driver\_face\_direction\_cmd (driver.c)

helo\_tick (helo.c)

hull\_to\_world\_from\_orientation (flyingveh.c)

mat\_rot\_init (mat\_r\_init.c)

pilot\_face\_direction (pilot.c)

**Called Function****Calling Function (filename)**

sin (cont.)	plane_tick (plane.c) turret_muzzle_position_in_world_coordinates (turret.c) turret_set_scan_parms (turret.c)
sleep	yp_first (yp_enum.c)
sockaddr_init	udp_open (udp_berkeley.c)
socket	check_pmap_up (yp_bind.c) clntudp_bufcreate (clnt_udp.c) openlog (syslog.c) res_send (res_send.c) udp_open (udp_berkeley.c)
sort_damage_table	database_init (main.c)
sort_form_db	database_init (main.c)
sort_tag_table	sort_damage_table (df_damage.c) database_init (main.c)
sort_trim_hits	patch (pve_checkvis.c)
splice_out_vehicle_cluster	remove_clustered_vehicle (reporter.c) update_clusters (reporter.c)
potter_init_table	spotter_tick (spotter.c) allocate_spotter_tables (spotter.c)
spotter_remove_vehicles	composite_remove_vehicles (composite.c)
spotter_save_weight	targeting_tick (targeting.c)
spotter_show	composite_show (composite.c)
spotter_show_table	spotter_show (spotter.c)
potter_sum_inferior_composite_tables	spotter_tick (spotter.c)
spotter_tick	composite_tick (composite.c)
spread_increment	spread_increment (formation.c) get_formation_layout (formation.c)
sprintf	_tztzab (timezone.c) asctime (ctime.c) change_movement_and_report (cis.c) clnt_spcreateerror (clnt_perror.c) clnt_sperror (clnt_perror.c) commander_get_mission_status (commander.c) composite_generate_status_report (composite.c) dns_gethostbyaddr (dns_getnamadr.c) fill_generic_cis_report (cis.c) gasp (main.c) get_sender_of_last_packet (simnet.c) inet_ntoa (inet_ntoa.c) parser_init (parser.c) print_break_set_entry (breakset.c) res_mkquery (res_mkquery.c) res_querydomain (res_query.c) saf_vehicle_generate_status_report (saf_vehicle.c) saf_vehicle_set_marking (saf_vehicle.c) send_contact_report (reporter.c) send_shelling_report (reporter.c) send_spot_report (reporter.c) simnet_id_string_from_saf_id (id_hash.c) syslog (syslog.c) tdb_error (error.c) vehicle_status_string (saf_vehicle.c)

**Called Function**

sqrt

**Calling Function (filename)**

asin (../asincos.s)  
 combined\_velocity (pilot.c)  
 compute\_damage\_keys (df\_damage.c)  
 database\_df\_damage\_query (df\_damage.c)  
 database\_if\_damage\_query (if\_damage.c)  
 denorm\_sqrt (../sqrt.s)  
 detectable (detection.c)  
 diffraction\_diff (pve\_checkvis.c)  
 distance (water\_utilities.c)  
 exaggerate\_bridges (route.c)  
 fire\_missile\_at\_target (missile.c)  
 fly\_missile (missile.c)  
 followvehicle (driver.c)  
 generate\_weapon\_hit (weapons.c)  
 generate\_weapon\_miss (weapons.c)  
 groundveh\_tick (groundveh.c)  
 helo\_tick (helo.c)  
 hull\_to\_world\_from\_direction (missile.c)  
 interior\_angle\_between\_vectors (math.c)  
 missile\_ground\_impact (missile.c)  
 missile\_maybe\_hit\_target (missile.c)  
 missile\_set\_desired\_direction (missile.c)  
 missile\_show (missile.c)  
 noa\_damp (misc.c)  
 p\_follower\_gen\_coord\_goal\_pnt (p\_follower.c)  
 p\_follower\_leader\_passed\_point (p\_follower.c)  
 phase\_two\_collision\_check (collision.c)  
 pilot\_goto\_endpoint (pilot.c)  
 pilot\_point\_at\_target (pilot.c)  
 plane\_tick (plane.c)  
 remote\_next\_road\_point (remote.c)  
 reporter\_show (reporter.c)  
 routepoint\_distance (route.c)  
 saf\_vehicle\_generate\_status\_report (saf\_vehicle.c)  
 shoot\_target (gunner.c)  
 startup (pve\_checkvis.c)  
 targeting\_show (targeting.c)  
 tdb\_get\_hull\_to\_world (h\_to\_w.c)  
 turret\_point\_at\_target (turret.c)  
 vec2\_mag (math.c)  
 vec2\_norm (math.c)  
 vec\_normalize (vec\_norm.c)  
 vel2point (driver.c)  
 weapon\_show (weapons.c)  
 xy\_dir\_and\_range (pilot.c)  
 z\_velocity (pilot.c)  
 init\_stuff (main.c)  
 isolate\_connection (main.c)  
 ProcessAddlDescriptors (params.c)  
 ProcessHost (params.c)

srand  
 sscanf

<u>Called Function</u>	<u>Calling Function (filename)</u>
sscanf (cont.)	ProcessInitDescriptors (params.c) ProcessMaxSubscriptions (params.c) ProcessSite (params.c) send_contact_report (reporter.c) send_shelling_report (reporter.c) send_spot_report (reporter.c) set_exercise_id (main.c) yylex (lexer.c)
stack_push	yyparse (parser.y) stack_push_array (parser.y)
stack_push_array	yyparse (parser.y)
start_avoiding_collision	collision_tick (collision.c)
start_avoiding_house	collision_tick (collision.c)
start_disengaging	collision_tick (collision.c)
start_resupply_of_to	sbx_resupply (sbx.c) vehicle_resupply (parser.c)
start_simnet	main (main.c)
start_ticking	remote_start_ticking (remote.c) composite_start_ticking (composite.c) saf_vehicle_start_ticking (saf_vehicle.c)
startup	pve_checkvis (pve_checkvis.c)
stat	parse_servfile (vis.c)
stationpoint	followvehicle (driver.c) pilot_stationpoint (pilot.c) mission_stationpoint (driver.c)
stealth_send_attach_to_vehicle	sbx_attach_stealth (sbx.c)
stealth_send_teleport_to	stealth_attach_to (parser.c) sbx_attach_stealth (sbx.c) stealth_attach_to (parser.c) stealth_teleport_to (parser.c)
stop	driver_tick (driver.c) followvehicle (driver.c)
stop_ticking	remote_deactivate (remote.c)
store_hit	check_edge_hit (pve_checkvis.c) check_tree_hit (pve_checkvis.c) check_object (pve_checkvis.c)
strcasecmp	ht_gethostbyname (ht_getnamadr.c)
strcat	hostalias (res_query.c) clnt_spcreateerror (clnt_perror.c) create_bridges (bridges.c) create_buildings (trees.c) create_contours (trees.c) create_lakes (bridges.c) create_river_ints (rivers.c) create_rivers (rivers.c) create_road_ints (roads.c) create_roads (roads.c) create_tree_canopies (trees.c) create_trees (trees.c) init_terrain_stuff (main.c) read_quadtree (terrain.c)



<u>Called Function</u>	<u>Calling Function (filename)</u>
strcat (cont.)	syslog (syslog.c) tzload (ctime.c)
strcmp	activate_new_cis (cis.c) AssocReadParams (params.c) get_symbol (symbol.c) next_serv (vis.c) parse_servfile (vis.c) ProcessProtocolFamily (params.c) tdb_right_format (version.c)
strcpy	clnt_sperror (clnt_perror.c) cm_execute_overlay (cm.c) create_bridges (bridges.c) create_buildings (trees.c) create_contours (trees.c) create_lakes (bridges.c) create_river_ints (rivers.c) create_rivers (rivers.c) create_road_ints (roads.c) create_roads (roads.c) create_tree_canopies (trees.c) create_trees (trees.c) cvt (doprnt.c) dstsetkernel (ctime.c) get_string (symbol.c) get_symbol (symbol.c) init_terrain_stuff (main.c) net_stat_string (net_stat.c) open_cmc (net_open.c) print_str (perror.c) read_quadtree (terrain.c) res_init (res_init.c) syslog (syslog.c) tdb_error (error.c) tdb_get_db_name (dump.c) tzload (ctime.c) tzsetgmt (ctime.c) tzsetkernel (ctime.c)
string_for_altitude_type	sbx_altitude (sbx.c)
string_for_attack_type	sbx_attack (sbx.c)
string_for_hold_type	sbx_hold (sbx.c) sbx_goto_point (sbx.c)
stringcopy	CommandLog (par_hist.c)
strlen	_doprnt (doprnt.c) change_movement_and_report (cis.c) clnt_spcerror (clnt_perror.c) clnt_sperror (clnt_perror.c) commander_get_mission_status (commander.c) composite_generate_status_report (composite.c) cvt (doprnt.c) fill_generic_cis_report (cis.c) get_string (symbol.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
strlen (cont.)	get_symbol (symbol.c) getanswer (dns_getnamadr.c) identify_version (version.c) net_open (net_open.c) print_break_set_entry (breakset.c) print_str (perror.c) res_querydomain (res_query.c) saf_vehicle_generate_status_report (saf_vehicle.c) simnet_getstats (simnet.c) syslog (syslog.c) tzload (ctime.c) vehicle_status_string (saf_vehicle.c)
strncmp	xdr_string (xdr.c) doit (yp_innetgr.c) _findenv (getenv.c)
strncpy	res_init (res_init.c) hostalias (res_query.c) openlog (syslog.c) print_str (perror.c) res_init (res_init.c) tdb_get_tdb_info (tdb_init.c) timezone (timezone.c)
strpbrk	doit (yp_gnetgr.c)
strsave	ht_getnetgrent (ht_gngrent.c)
strtok	parser_init (parser.c) AssocReadParams (params.c)
trtol	interpret (yp_getpwent.c)
stty	tty_restore_modes (setup.c) tty_setup_modes (setup.c)
syslog	clnt_pcreateerror (clnt_perror.c) clnt_permon (clnt_perror.c) clntudp_bufcreate (clnt_udp.c) doit (yp_gnetgr.c) rpc_perror (clnt_perror.c) rpc_perror1 (clnt_perror.c) rpc_perror2 (clnt_perror.c)
tag_error	find_tag (tags.c) find_tag_sorted (tags.c)
tan	create_missile (missile.c)
target_in_position	update_target_list (targeting.c)
target_priority	target_type_ok (targeting.c)
target_type_ok	update_target_list (targeting.c)
targeting_set_fire_at_pointair	pilot_start_hoverattack (pilot.c)
targeting_set_hold_fire	pilot_start_hoverattack_egress (pilot.c)
targeting_set_parameters	saf_vehicle_set_targeting_parameters (saf_vehicle.c)
targeting_show	saf_vehicle_show (saf_vehicle.c)
targeting_tick	saf_vehicle_tick (saf_vehicle.c)
tdb_cache_disable	tdb_init_memory (memory.c)
tdb_error	report_error_from_tdb_once (misc.c) test_maxima (pve_checkvis.c) init_terrain_stuff (main.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
tdb_get_db_format	tdb_error (error.c)
tdb_get_db_name	tdb_right_format (version.c)
tdb_get_gl	init_terrain_stuff (main.c)
	create_entity (entity.c)
	ground_level (pilot.c)
	parser_create_vehicle (parser.c)
	generate_indirect_fire_pkt (pro_sim.c)
tdb_get_hull_to_world	tdb_place_vehicle (h_to_w.c)
tdb_get_tdb_info	tdb_init_memory (memory.c)
	tdb_init_cache (tdb_init.c)
tdb_get_terrain	tdb_get_z (elevation.c)
	test_maxima (pve_checkvis.c)
tdb_get_z	clip_to_tdb (pve_checkvis.c)
	fly_missile (missile.c)
	get_soil_type (misc.c)
	sort_trim_hits (pve_checkvis.c)
	stealth_teleport_to (parser.c)
	tdb_get_gl (misc.c)
	tdb_get_zl (misc.c)
	tracks_set_support_plane (h_to_w.c)
tdb_get_zl	z_velocity (pilot.c)
tdb_giv_xy_get_utm	change_movement_and_report (cis.c)
	composite_generate_status_report (composite.c)
	fill_generic_cis_report (cis.c)
	saf_vehicle_generate_status_report (saf_vehicle.c)
	send_contact_report (reporter.c)
	send_shelling_report (reporter.c)
	send_spot_report (reporter.c)
tdb_init_cache	init_terrain_stuff (main.c)
tdb_init_memory	init_terrain_stuff (main.c)
tdb_init_patch_guards	init_terrain_stuff (main.c)
tdb_map_xy_to_utm	tdb_giv_xy_get_utm (map.c)
tdb_place_vehicle	pilot_start_landed (pilot.c)
	groundveh_move (groundveh.c)
	saf_vehicle_teleport (saf_vehicle.c)
tdb_read_header	tdb_get_tdb_info (tdb_init.c)
tdb_right_format	tdb_init_memory (memory.c)
	tdb_init_cache (tdb_init.c)
tdb_set_dumpfile	tdb_init_memory (memory.c)
	tdb_init_cache (tdb_init.c)
terrain	patch (pve_checkvis.c)
terrain_cache_inquire	tdb_get_terrain (get_patch.c)
terrain_memory_inquire	tdb_get_terrain (get_patch.c)
test_clutter	pve_checkvis (pve_checkvis.c)
test_maxima	pve_checkvis (pve_checkvis.c)
test_mins	pve_checkvis (pve_checkvis.c)
tickable_note_start_tick	saf_vehicle_tick (saf_vehicle.c)
	remote_tick (remote.c)
time	syslog (syslog.c)
top_left_corner	left_column (minimum_clip.c)
track_target	fly_round (weapons.c)
	gunner_tick (gunner.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
tracks_calc_unit_normal	tracks_set_support_plane (h_to_w.c)
tracks_set_support_plane	tdb_get_hull_to_world (h_to_w.c)
treelines	canopies (pve_checkvis.c)
	patch (pve_checkvis.c)
trees	patch (pve_checkvis.c)
tty_exit	parser_restore_term (parser.c)
tty_getchar	tty_tick (interface.c)
tty_malloc_break_set	tty_setup_parser_break_set (geyer.c)
tty_parser_init	parser_init (parser.c)
tty_restore_modes	tty_exit (interface.c)
tty_setup_modes	tty_parser_init (geyer.c)
tty_setup_parser_break_set	tty_parser_init (geyer.c)
turret_firepower_kill	saf_vehicle_firepower_kill (saf_vehicle.c)
turret_interest_dir	compute_interest_direction (detection.c)
turret_muzzle_position_in_world_coordinates	muzzle_position_in_world_coordinates (weapons.c)
turret_point_at_target	point_weapon_at_target (gunner.c)
turret_scan	scan_weapon (gunner.c)
turret_set_scan_parms	composite_assume_formation_internal (composite.c)
turret_show	saf_vehicle_show (saf_vehicle.c)
turret_slew	turret_point_at_target (turret.c)
	turret_scan (turret.c)
tzload	tzset (ctime.c)
tzset	localtime (ctime.c)
tzsetgmt	tzset (ctime.c)
tzsetkernel	tzset (ctime.c)
uc	ParseMatch (par_util.c)
udp_close	rudp_close (rel_conn.c)
udp_open	rudp_open (rel_conn.c)
udp_read	rudp_read_message (rel_conn.c)
udp_write	rudp_send (rel_conn.c)
	udp_read (udp_berkeley.c)
uidof	matchuid (yp_getpwent.c)
unget_locks	open_cmc (net_open.c)
ungetc	_doscan (doscan.c)
	_instr (doscan.c)
	_innum (doscan.c)
unhash_saf_id	composite_go_away (composite.c)
	remote_go_away (remote.c)
	saf_vehicle_go_away (saf_vehicle.c)
unit_send_pae_data	unit_send_pae_data (composite.c)
	create_unit (create.c)
unmap_buffers	open_cmc (net_open.c)
upcase	parser_init (parser.c)
update_cluster_com	add_vehicle_to_cluster (reporter.c)
	update_clusters (reporter.c)
	update_clusters (reporter.c)
update_cluster_heading	reporter_tick (reporter.c)
update_clusters	saf_vehicle_tick (saf_vehicle.c)
update_grid_entry_list	remote_tick (remote.c)
	saf_vehicle_teleport (saf_vehicle.c)
update_reporter_vehicles	reporter_tick (reporter.c)
update_target_list	targeting_tick (targeting.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
upshift	AssocReadParams (params.c) ProcessProtocolFamily (params.c)
usingypmap	match (yp_gnetgr.c)
v1filter	vldofirst (yp_enum.c)
v1prot_dofirst	vldofirst (yp_enum.c)
v1prot_donext	vldonext (yp_enum.c)
valid_quad	get_quad_nodes_internal (search.c)
vec2_add	followvehicle (driver.c) get_next_circle_point (pilot.c) p_follower_find_pnt_in_turn (p_follower.c) p_follower_flip_in_turn (p_follower.c) p_follower_fly_in_coord_pos (p_follower.c) p_follower_get_wrld_offset (p_follower.c) p_follower_pnt_in_hard_turn (p_follower.c) p_follower_pnt_in_shallow_turn (p_follower.c) project_point (pilot.c) stationpoint (driver.c)
vec2_copy	cm_add_route (cm.c) commander_attack (commander.c) compute_situation (pilot.c) get_leader_state (driver.c) get_next_circle_point (pilot.c) ground_level (pilot.c) p_follower_find_pnt_in_turn (p_follower.c) p_follower_flip_in_turn (p_follower.c) p_follower_get_wrld_offset (p_follower.c) p_follower_new_rel_rt_pnt (p_follower.c) p_follower_pnt_in_shallow_turn (p_follower.c) p_follower_set_desired_vel (p_follower.c) p_follower_stop_coord (p_follower.c) pilot_init_followroute (pilot.c) pilot_init_hoverattack (pilot.c) pilot_is_facing_direction (pilot.c) pilot_orbithold (pilot.c) pilot_start_gotopoint (pilot.c) plane_tick (plane.c) project_point (pilot.c) stationpoint (driver.c) vec2_rotate (pilot.c)
vec2_dot	create_new_cluster (reporter.c) enemy_disposition (predicates.c) exaggerate_bridges (route.c) followvehicle (driver.c) get_leader_state (driver.c) get_unit_direction (driver.c) p_follower_leader_passed_point (p_follower.c) p_follower_passed_point (p_follower.c) pilot_goto_endpoint (pilot.c) pilot_gotopoint (pilot.c) pilot_point_at_target (pilot.c) re_assign_routepoints (route.c)

**Called Function****Calling Function (filename)**

vec2\_dot (cont.)

remote\_next\_road\_point (remote.c)

vec2\_init

update\_cluster\_heading (reporter.c)

cm\_get\_center\_of\_mass (navigator.c)

p\_follower\_new\_rel\_rt\_pnt (p\_follower.c)

p\_follower\_set\_desired\_vel (p\_follower.c)

p\_follower\_stop\_coord (p\_follower.c)

re\_assign\_routepoints (route.c)

vec2\_mag

get\_leader\_state (driver.c)

get\_unit\_direction (driver.c)

p\_follower\_arrive\_at\_same\_time (p\_follower.c)

p\_follower\_fly\_in\_coord\_pos (p\_follower.c)

p\_follower\_gen\_coord\_goal\_pnt (p\_follower.c)

vel2point (driver.c)

vec2\_mag2

are\_we\_there (pilot.c)

commander\_attack (commander.c)

p\_follower\_find\_pnt\_in\_turn (p\_follower.c)

p\_follower\_flip\_in\_turn (p\_follower.c)

p\_follower\_flying\_independent (p\_follower.c)

p\_follower\_gen\_coord\_goal\_pnt (p\_follower.c)

pilot\_point\_at\_target (pilot.c)

vec2\_norm

commander\_attack (commander.c)

enemy\_disposition (predicates.c)

followvehicle (driver.c)

p\_follower\_find\_pnt\_in\_turn (p\_follower.c)

p\_follower\_flip\_in\_turn (p\_follower.c)

p\_follower\_fly\_in\_coord\_pos (p\_follower.c)

p\_follower\_get\_wrld\_offset (p\_follower.c)

p\_follower\_set\_desired\_vel (p\_follower.c)

plane\_tick (plane.c)

set\_speed\_dir (driver.c)

vehicle\_facing\_point (pilot.c)

vec2\_range\_squared

action\_drill\_needed (predicates.c)

cluster\_shell (reporter.c)

cluster\_vehicle (reporter.c)

hasty\_attack\_needed (predicates.c)

issue\_reports (reporter.c)

need\_decluster (reporter.c)

update\_clusters (reporter.c)

vec2\_rotate

get\_next\_circle\_point (pilot.c)

vec2\_scale

cm\_get\_center\_of\_mass (navigator.c)

followvehicle (driver.c)

get\_next\_circle\_point (pilot.c)

p\_follower\_arrive\_at\_same\_time (p\_follower.c)

p\_follower\_fly\_in\_coord\_pos (p\_follower.c)

p\_follower\_gen\_coord\_goal\_pnt (p\_follower.c)

p\_follower\_leader\_passed\_point (p\_follower.c)

p\_follower\_passed\_point (p\_follower.c)

p\_follower\_pnt\_in\_hard\_turn (p\_follower.c)

p\_follower\_set\_desired\_vel (p\_follower.c)

pilot\_goto\_endpoint (pilot.c)

pilot\_gotopoint (pilot.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
vec2_scale (cont.)	plane_tick (plane.c) project_point (pilot.c) xy_dir_and_range (pilot.c) z_velocity (pilot.c)
vec2_set	pilot_init_hoverattack (pilot.c) commander_attack (commander.c)
vec2_sub	are_we_there (pilot.c) commander_attack (commander.c) followvehicle (driver.c) p_follower_find_pnt_in_turn (p_follower.c) p_follower_flip_in_turn (p_follower.c) p_follower_fly_in_coord_pos (p_follower.c) p_follower_flying_independent (p_follower.c) p_follower_gen_coord_goal_pnt (p_follower.c) p_follower_get_wrld_offset (p_follower.c) p_follower_hoverhold_tick (p_follower.c) p_follower_landhold_tick (p_follower.c) p_follower_leader_passed_point (p_follower.c) p_follower_passed_point (p_follower.c) p_follower_set_desired_vel (p_follower.c) pilot_init_land (pilot.c) pilot_is_facing_direction (pilot.c) re_assign_routepoints (route.c) vehicle_facing_point (pilot.c) vel2point (driver.c)
vec2_veh2world	xy_dir_and_range (pilot.c) p_follower_get_wrld_offset (p_follower.c) p_follower_pnt_in_shallow_turn (p_follower.c) stationpoint (driver.c)
vec2_world2veh	enemy_disposition (predicates.c) followvehicle (driver.c)
vec_add	add_shelling_to_cluster (reporter.c) compute_explosion_point (missile.c) fire_missile_at_target (missile.c) fly_missile (missile.c) missile_set_desired_direction (missile.c) muzzle_position_in_world_coordinates (weapons.c) saf_vehicle_est_position (saf_vehicle.c) start_disengaging (collision.c) turret_muzzle_position_in_world_coordinates (turret.c) update_cluster_com (reporter.c)
vec_copy	z_velocity (pilot.c) collision_vehicle_rammed (collision.c) composite_tick (composite.c) compute_interest_direction (detection.c) create_entity (entity.c) create_new_cluster (reporter.c) create_new_shelling (reporter.c) create_pilot (pilot.c) create_saf_vehicle (saf_vehicle.c) detect_collision_tick (collision.c)

Called Function

vec\_copy (cont.)

Calling Function (filename)

	detect_imminent_collision_tick (collision.c)
	enemy_disposition (predicates.c)
	fire_missile_at_target (missile.c)
	fire_weapon_at_target (weapons.c)
	fly_missile (missile.c)
	followvehicle (driver.c)
	generate_indirect_fire_pkt (pro_sim.c)
	generate_weapon_miss (weapons.c)
	get_soil_type (misc.c)
	get_unit_direction (driver.c)
	p_follower_hoverhold (p_follower.c)
	pilot_init_hoverattack (pilot.c)
	pilot_orbithold (pilot.c)
	pilot_point_at_target (pilot.c)
	pilot_tick (pilot.c)
	remote_tick (remote.c)
	saf_vehicle_stop_mimicing (saf_vehicle.c)
	saf_vehicle_tick (saf_vehicle.c)
	sbx_attach_stealth (sbx.c)
	send_contact_report (reporter.c)
	send_spot_report (reporter.c)
	set_speed_dir (driver.c)
	shoot_target (gunner.c)
	start_disengaging (collision.c)
	stealth_attach_to (parser.c)
	stop (driver.c)
	update_clusters (reporter.c)
	vec2_veh2world (driver.c)
	vec2_world2veh (driver.c)
	vel2point (driver.c)
vec_cross_prod	tracks_calc_unit_normal (h_to_w.c)
	tdb_get_hull_to_world (h_to_w.c)
vec_dot_prod	compute_explosion_point (missile.c)
	detectable (detection.c)
	fly_missile (missile.c)
	intervis_get_view (intervis.c)
	missile_ground_impact (missile.c)
	missile_maybe_hit_target (missile.c)
	missile_set_desired_direction (missile.c)
	p_follower_pnt_in_hard_turn (p_follower.c)
	target_type_ok (targeting.c)
vec_init	air_tick (flyingveh.c)
	airveh_init (flyingveh.c)
	are_we_there (pilot.c)
	create_driver (driver.c)
	create_entity (entity.c)
	create_missile (missile.c)
	create_pilot (pilot.c)
	create_targeting (targeting.c)
	groundveh_tick (groundveh.c)
	helo_tick (helo.c)



<u>Called Function</u>	<u>Calling Function (filename)</u>
vec_init (cont.)	init_pilot_state_machine (pilot.c) missile_deactivate (missile.c) pilot_hoverattack_complete (pilot.c) pilot_hoverhold (pilot.c) pilot_start_hoverattack (pilot.c) pilot_start_landed (pilot.c) start_disengaging (collision.c) update_cluster_com (reporter.c)
vec_mat_mul	muzzle_position_in_world_coordinates (weapons.c) tdb_get_hull_to_world (h_to_w.c) tracks_set_support_plane (h_to_w.c) turret_interest_dir (turret.c) turret_muzzle_position_in_world_coordinates (turret.c) vec_z_rotate (math.c)
vec_normalize	fire_missile_at_target (missile.c) fire_weapon_at_target (weapons.c) fly_missile (missile.c) get_impact_and_trajectory (impact.c) get_leader_state (driver.c) missile_maybe_hit_target (missile.c) missile_set_desired_direction (missile.c) start_avoiding_house (collision.c) start_disengaging (collision.c) stationpoint (driver.c)
vec_scale	tracks_calc_unit_normal (h_to_w.c) add_shelling_to_cluster (reporter.c) attackatwill_tick (pilot.c) compute_explosion_point (missile.c) fire_missile_at_target (missile.c) fire_weapon_at_target (weapons.c) fly_missile (missile.c) followvehicle (driver.c) get_i_and_t_from_normal (impact.c) groundveh_move (groundveh.c) missile_set_desired_direction (missile.c) pilot_hoverattack (pilot.c) pilot_orbithold (pilot.c) pilot_point_at_target (pilot.c) saf_vehicle_est_position (saf_vehicle.c) tdb_get_hull_to_world (h_to_w.c) update_cluster_com (reporter.c)
vec_set	create_driver (driver.c) driver_face_direction_cmd (driver.c) driver_follow_vehicle_cmd (driver.c) driver_goto_point_cmd (driver.c) init_pilot_state_machine (pilot.c) p_follower_hoverhold (p_follower.c) pilot_face_direction (pilot.c) pilot_landing (pilot.c) pilot_start_takingoff (pilot.c) pilot_takingoff (pilot.c) vel2point (driver.c)

**Called Function**

vec\_sub

vec\_z\_rotate

vehicle\_bong

vehicle\_component\_name

vehicle\_facing\_point

vehicle\_fill\_in\_appearance\_data

vehicle\_fill\_in\_position\_data

vehicle\_impact\_to\_sbx

vehicle\_iterator\_once\_next

ehicle\_iterator\_reset

vehicle\_kill

vehicle\_kill\_remote

vehicle\_list\_append

vehicle\_manager\_count

vehicle\_manager\_count\_force

vehicle\_manager\_count\_hosts

vehicle\_manager\_count\_sites

vehicle\_manager\_print

vehicle\_ping

vehicle\_reappeared

vehicle\_show

vehicle\_status\_string

vehicle\_wall\_name

vel2point

vfork

**Calling Function (filename)**

compute\_explosion\_point (missile.c)

enemy\_disposition (predicates.c)

exagerate\_bridges (route.c)

fire\_missile\_at\_target (missile.c)

fire\_weapon\_at\_target (weapons.c)

fly\_missile (missile.c)

get\_impact\_and\_trajectory (impact.c)

missile\_ground\_impact (missile.c)

missile\_maybe\_hit\_target (missile.c)

missile\_set\_desired\_direction (missile.c)

pilot\_point\_at\_target (pilot.c)

remote\_next\_road\_point (remote.c)

routepoint\_distance (route.c)

start\_avoiding\_house (collision.c)

start\_disengaging (collision.c)

tracks\_calc\_unit\_normal (h\_to\_w.c)

tracks\_set\_support\_plane (h\_to\_w.c)

turret\_point\_at\_target (turret.c)

update\_cluster\_heading (reporter.c)

start\_avoiding\_collision (collision.c)

groundveh\_move (groundveh.c)

vehicle\_bong\_do (parser.c)

database\_df\_damage\_query (df\_damage.c)

p\_follower\_flying\_independent (p\_follower.c)

saf\_vehicle\_fill\_in\_appearance\_data (saf\_vehicle.c)

remote\_fill\_in\_appearance\_data (remote.c)

saf\_vehicle\_fill\_in\_position\_data (saf\_vehicle.c)

remote\_fill\_in\_position\_data (remote.c)

protocol\_sim\_process (simnet.c)

sbx\_connection\_stat\_pulse (sbx.c)

sbx\_connection\_reset\_msg (sbx.c)

sbx\_connection\_synch\_received (sbx.c)

sbx\_connection\_generate\_arty\_msg (sbx.c)

vehicle\_catastrophe (parser.c)

vehicle\_kill (pro\_sim.c)

vehicle\_bong (pro\_sim.c)

update\_clusters (reporter.c)

count\_vehicles (parser.c)

count\_forces (parser.c)

count\_hosts (parser.c)

count\_sites (parser.c)

show\_vehicle\_ids (parser.c)

vehicle\_ping\_do (parser.c)

update\_reporter\_vehicles (reporter.c)

saf\_vehicle\_show (saf\_vehicle.c)

remote\_show (remote.c)

saf\_vehicle\_generate\_status\_report (saf\_vehicle.c)

saf\_vehicle\_show (saf\_vehicle.c)

database\_df\_damage\_query (df\_damage.c)

followvehicle (driver.c)

driver\_tick (driver.c)

syslog (syslog.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
vis_nextserv	endnetent (getnetent.c) endnetgrent (getnetgrent.c) endprotoent (getprotoent.c) endservent (getservent.c) gethostbyaddr (gethostnamadr.c) gethostbyname (gethostnamadr.c) gethostent (gethostnamadr.c) getnetent (getnetent.c) getnetgrent (getnetgrent.c) getprotoent (getprotoent.c) getservbyname (getservent.c) getservbyport (getservent.c) getservent (getservent.c) inetgr (inetgr.c) setnetent (getnetent.c) setnetgrent (getnetgrent.c) setprotoent (getprotoent.c) setservent (getservent.c) start_simnet (simnet.c) syslog (syslog.c)
wait	send_cmc (net_osend.c)
wait_for_empty_ring_element	send_cmc_8023 (net_send.c) invoke_functions_until (sched.c) read_terrain_files (terrain.c) groundveh_tick (groundveh.c) create_weapon_systems (weapons.c) loader_tick (loader.c) loader_tick (loader.c) weapon_systems_show (weapons.c) loader_tick (loader.c) weapon_systems_show (weapons.c) weapon_show (weapons.c) saf_vehicle_checkpoint_state (saf_vehicle.c) saf_vehicle_fake_resupply (saf_vehicle.c) saf_vehicle_reinit (saf_vehicle.c) saf_vehicle_show (saf_vehicle.c) loader_tick (loader.c) set_critical_performance_level (perf.c) insert_periodic_function (maint.c) remove_function (maint.c)
wait_until	angle_between_vectors (math.c)
warn_about_point_space	choose_skirt_point (collision.c)
water_check	compute_damage_keys (df_damage.c)
weapon_configure	start_avoiding_collision (collision.c)
weapon_deselect	driver_tick (driver.c)
weapon_load	followvehicle (driver.c)
weapon_priority_list_show	_flsbuf (flsbuf.c)
weapon_select	fflush (flsbuf.c)
weapon_show	pflush (perror.c)
weapon_state_to_string	res_send (res_send.c)
weapon_systems_checkpoint	syslog (syslog.c)
weapon_systems_rearm	
weapon_systems_reinit	
weapon_systems_show	
weapon_unload	
which_event_ring	
which_side	
within_delta	
write	

<u>Called Function</u>	<u>Calling Function (filename)</u>
write_buffer_all_sbx	broadcast_appearance_data (sbx.c) broadcast_pae_data (sbx.c) broadcast_veh_is_gone (sbx.c) gasp (main.c)
write_string_to_tty	print_break_set_entry (breakset.c)
xdr_bytes	xdr_datum (ypxdr.c) xdr_netobj (xdr.c)
xdr_callhdr	xdr_opaque_auth (rpc_prot.c)
xdr_datum	clntudp_bufcreate (clnt_udp.c) xdr_ypreq_key (ypxdr.c) xdr_ypresp_key_val (ypxdr.c) xdr_ypresp_val (ypxdr.c)
xdr_enum	xdr_accepted_reply (rpc_prot.c) xdr_callhdr (rpc_prot.c) xdr_opaque_auth (rpc_prot.c) xdr_rejected_reply (rpc_prot.c) xdr_replymsg (rpc_prot.c) xdr_union (xdr.c)
xdr_int	xdr_char (xdr.c)
xdr_long	xdr_int (xdr.c)
xdr_opaque	xdr_enum (xdr.c) xdr_bytes (xdr.c) xdr_des_block (rpc_prot.c) xdr_string (xdr.c) xdr_yp_binding (ypxdr.c) xdr_yp_inaddr (ypxdr.c)
xdr_opaque_auth	authnone_create (auth_none.c) clntudp_call (clnt_udp.c) xdr_accepted_reply (rpc_prot.c)
xdr_replymsg	clntudp_call (clnt_udp.c)
xdr_string	xdr_wrapstring (xdr.c) xdr_ypdomain_wrap_string (ypxdr.c) xdr_ypmap_wrap_string (ypxdr.c) xdr_ypowner_wrap_string (ypxdr.c)
xdr_u_int	xdr_u_char (xdr.c) xdr_bytes (xdr.c) xdr_string (xdr.c)
xdr_u_long	xdr_accepted_reply (rpc_prot.c) xdr_callhdr (rpc_prot.c) xdr_deskey (rpc_prot.c) xdr_pmap (pmap_prot.c) xdr_rejected_reply (rpc_prot.c) xdr_replymsg (rpc_prot.c) xdr_u_int (xdr.c) xdr_ypmap_parms (ypxdr.c) xdr_ypresp_key_val (ypxdr.c) xdr_ypresp_val (ypxdr.c)
xdr_union	_xdr_yprequest (ypv1_xdr.c) _xdr_ypresponse (ypv1_xdr.c) xdr_replymsg (rpc_prot.c) xdr_ypbind_resp (ypxdr.c)
xdr_yp_binding	_xdr_ypbind_oldsetdom (ypv1_xdr.c)

<u>Called Function</u>	<u>Calling Function (filename)</u>
xdr_yp_inaddr	xdr_yp_binding (ypxdr.c)
xdr_ypdomain_wrap_string	_xdr_ypbind_oldsetdom (ypv1_xdr.c)
	xdr_ypmap_parms (ypxdr.c)
	xdr_ypreq_key (ypxdr.c)
	xdr_ypreq_nokey (ypxdr.c)
xdr_ypmap_wrap_string	xdr_ypreq_key (ypxdr.c)
	xdr_ypreq_nokey (ypxdr.c)
	xdr_ypmap_parms (ypxdr.c)
xdr_ypowner_wrap_string	xdr_ypmap_parms (ypxdr.c)
xdrmem_create	clntudp_bufcreate (clnt_udp.c)
	clntudp_call (clnt_udp.c)
	authnone_create (auth_none.c)
xy_dir_and_range	compute_situation (pilot.c)
	get_next_circle_point (pilot.c)
	pilot_orbithold (pilot.c)
	project_point (pilot.c)
yellowup	yp_getservbyport (yp_getservent.c)
	yp_sethostent (yp_gethostent.c)
	yp_setnetent (yp_gnetent.c)
	yp_setprotoent (yp_getpent.c)
	yp_setrpcent (yp_getrpcent.c)
yp_bind	yp_setgrent (yp_getgrent.c)
yp_endgrent	yp_getgrgid (yp_getgrent.c)
yp_endhostent	yp_gethostbyname (yp_gethostent.c)
yp_endnetent	yp_getnetbyaddr (yp_gnetent.c)
yp_endnetgrent	yp_setnetgrent (yp_gnetgr.c)
yp_endprotoent	yp_getprotobynumber (yp_getpent.c)
yp_endpwent	yp_getpwnam (yp_getpwent.c)
yp_endrpcent	yp_getrpcbynumber (yp_getrpcent.c)
yp_endservent	yp_getservbyport (yp_getservent.c)
yp_first	yp_getnetent (yp_gnetent.c)
yp_getgrent	yp_getgrgid (yp_getgrent.c)
yp_getpwent	yp_getpwnam (yp_getpwent.c)
yp_getrpcent	yp_getrpcbyname (yp_getrpcent.c)
yp_getservent	yp_getservbyport (yp_getservent.c)
yp_match	yp_gethostbyaddr (yp_gethostent.c)
yp_next	yp_getnetent (yp_gnetent.c)
yp_setgrent	yp_getgrgid (yp_getgrent.c)
yp_sethostent	yp_gethostbyname (yp_gethostent.c)
yp_setnetent	yp_getnetbyaddr (yp_gnetent.c)
yp_setprotoent	yp_getprotobynumber (yp_getpent.c)
yp_setpwent	yp_getpwnam (yp_getpwent.c)
yp_setrpcent	yp_getrpcbynumber (yp_getrpcent.c)
yp_setservent	yp_getservbyport (yp_getservent.c)
yp_unbind	yp_first (yp_enum.c)
ypprot_err	vldomatch (yp_match.c)
yyback	yylook (lexer.c)
yyerror	yylex (lexer.c)
	yyparse (parser.y)
yylex	yyparse (parser.y)
yparse	reader_read_file (parser.y)
yywrap	yylex (lexer.c)

**Called Function****Calling Function (filename)**

z\_velocity

attackatwill\_tick (pilot.c)  
p\_follower\_hoverhold (p\_follower.c)  
p\_follower\_hoverhold\_tick (p\_follower.c)  
p\_follower\_landhold\_tick (p\_follower.c)  
p\_follower\_set\_desired\_vel (p\_follower.c)  
pilot\_goto\_endpoint (pilot.c)  
pilot\_gotopoint (pilot.c)  
pilot\_hoverattack (pilot.c)  
pilot\_hoverattack\_complete (pilot.c)  
pilot\_hoverhold (pilot.c)  
pilot\_orbithold (pilot.c)  
collect\_perf\_stat (perf.c)  
perf\_monitor\_on (perf.c)

zero\_perf\_stats

**APPENDIX D**

The following is a list of globally accessible user defined types and the files in which they are defined.

**User Defined Type****Where Typedef Defined**

*FUNC_PTR	sim_style.h
*PFV	sim_types.h
*POINTER	sim_style.h
*STRING	mass_std.h
ActivateReason	p_sim.h
ActivateRequestVariant	p_sim.h
ActivateResponseVariant	p_sim.h
ActivateResult	p_sim.h
address_entry	pnl_tst_dfn.h
AirframeSubsystems	status.h
AirVehicleSubsystems	status.h
Angle	basic.h
AssociationDataUnit	p_assoc.h
AssociationPDU	p_assoc.h
AssociationPDUKind	p_assoc.h
AssociationProtocolVersion	p_assoc.h
AssociationUserProtocol	p_assoc.h
AttachedVariant	p_stlth.h
AttachVariant	p_stlth.h
B1BBOX2D	dgi_std.h
B1BBOX3D	dgi_std.h
B1HSL	dgi_std.h
B1HSLO	dgi_std.h
B1MTX4X3	dgi_std.h
B1MTX4X4	dgi_std.h
B1P2D	dgi_std.h
B1P3D	dgi_std.h
B1P4D	dgi_std.h
B1RGB	dgi_std.h
B1RGO	dgi_std.h
B_LEVEL_TYPE	libpfile_dfn.h
BattleScheme	basic.h
bbd_device	bbddev.h
BOOLEAN	sim_types.h
Boolean	basic.h
BOUND_BOX	libfilter.h
BOUND_INFO	libfilter.h
BreachedLaneStatusVariant	p_data.h
BreachedLaneVariant	p_sim.h
BridgePacket	bridge_com.h
BridgePacketHeader	bridge_com.h
BurstDescriptor	basic.h
BVOL_SUPT	if_targets.h
BYTE	sim_types.h
Byte	types.h
CharacterSetType	basic.h
ChassisSubsystems	status.h

**User Defined Type****Where Typedef Defined**

cif_cb	libcif.h
cif_connection_table	libcif.h
cif_vec	libcif.h
CockpitSubsystems	status.h
CollisionVariant	p_sim.h
ComponentStatus	p_mgmt.h
CONTROL_IDENTIFIER	libpfile_dfn.h
DamageCause	p_data.h
DamageType	basic.h
data_arg	enparg.h
DataCollectionPDU	p_data.h
DataCollectionPDUKind	p_data.h
DataCollectionProtocolVersion	p_data.h
DeactivateReason	p_sim.h
DeactivateRequestVariant	p_sim.h
DeactivateResponseVariant	p_sim.h
DeactivateResult	p_sim.h
DED_MAP_ENTRY	libmap_dfn.h
device	drdev.h
DiscrepancyThresholds	libapp.h
E_PARAM	sim_types.h
EDGE_TYPE	libpfile_dfn.h
EffectType	p_data.h
ElectronicSubsystems	status.h
elevationRequestPDUKind	p_terra.h
ElevationRequestVariant	p_terra.h
elevationResponsePDUKind	p_terra.h
ElevationResponseVariant	p_terra.h
enp_registers	enparg.h
EquipStatusVariant	p_mgmt.h
ErrorReportSeverity	p_mgmt.h
ErrorReportVariant	p_mgmt.h
EventFlagVariant	p_data.h
EventID	basic.h
exec_req	sersvr.h
ExerciseID	basic.h
ExerciseStatusVariant	p_data.h
ExtNetworkBuffer	network.h
FIFO	fifo_dfn.h
FireResult	p_sim.h
FireType	p_sim.h
FireVariant	p_sim.h
ForceID	basic.h
FOV	if_header_struct.h
FOV	sim_cig_if.h
G_EDGE_TYPE	libpfile_dfn.h
GenericVehicleStatus	status.h
getstat_arg	enparg.h
gettime_arg	enparg.h
GridZone	map.h
GroundVehicleSubsystems	status.h
HASH_ENTRY	rva_lcc.h Vehicles CSCI SDD



User Defined TypeWhere Typedef Defined

HASH_TABLE	rva_lcc.h Vehicles CSCI SDD
HOST_INFO	libfilter.h
HWORD	mass_std.h
I2BBOX2D	dgi_std.h
I2BBOX3D	dgi_std.h
I2HSL	dgi_std.h
I2HSLO	dgi_std.h
I2MTX4X3	dgi_std.h
I2MTX4X4	dgi_std.h
I2P2D	dgi_std.h
I2P3D	dgi_std.h
I2P4D	dgi_std.h
I2RGB	dgi_std.h
I2RGBO	dgi_std.h
I4BBOX2D	dgi_std.h
I4BBOX3D	dgi_std.h
I4HSL	dgi_std.h
I4HSLO	dgi_std.h
I4MTX4X3	dgi_std.h
I4MTX4X4	dgi_std.h
I4P2D	dgi_std.h
I4P3D	dgi_std.h
I4P4D	dgi_std.h
I4RGB	dgi_std.h
I4RGBO	dgi_std.h
IDC_ENTRY	idc_dfn.h
ImpactVariant	p_sim.h
IndirectFireDetonation	p_sim.h
IndirectFireVariant	p_sim.h
INT_2	mass_std.h
INT_4	mass_std.h
key_t	sys/types.h
LaserRangeFinder	p_data.h
LaserRangeResult	p_data.h
LaserRangeVariant	p_data.h
LIGHT_TYPE	libpfile_dfn.h
liopb	serioctl.h
LoggerActivity	p_logger.h
LoggerAvailReplyVariant	p_logger.h
LoggerClockTickVariant	p_logger.h
LoggerCommandVariant	p_logger.h
LoggerInformationVariant	p_logger.h
LoggerMedium	p_logger.h
LoggerOperation	p_logger.h
LoggerPDU	p_logger.h
LoggerPDUKind	p_logger.h
LoggerProtocolVersion	p_logger.h
LoggerRTCType	p_logger.h
LoggerSeekRTC	p_logger.h
LoggerSpeedRTC	p_logger.h
LoggerStartRTC	p_logger.h
LoggerState	p_logger.h

User Defined TypeWhere Typedef Defined

LoggerStatusReplyVariant	p_logger.h
LoggerTime	p_logger.h
LongPt	longpt.h
low_stuff	enparg.h
LT_BVOC_ENTRY	sim_cig_if.h
LT_POLY_ENTRY	sim_cig_if.h
M_LEVEL_TYPE	libpfile_dfn.h
ManagementPDU	p_data.h
ManagementPDUKind	p_mgmt.h
ManagementProtocolVersion	p_mgmt.h
MapCoordinates	map.h
MarkerDescriptor	p_sim.h
MarkerVariant	p_sim.h
MarkerVariantNumber	p_sim.h
matrix_device	matrixdev.h
maxElevations	p_terra.h
maxGenericVehicleStores	status.h
mca_arg	enparg.h
MetamorphoseVariant	p_stlth.h
METER_TYPE	libpfile_dfn.h
MimicVariant	p_stlth.h
MineDescriptor	p_data.h
MinefieldVariant	p_data.h
Monitor_PDU	p_mon.h
Monitor_PDUKind	p_mon.h
MonitorKind	p_mon.h
MonitorResponseVariant	p_mon.h
MotiveSubsystems	status.h
MSG-BLK	if_cig_ctl.h
MSG_1ROTATION	sim_cig_if.h
MSG_2D_SETUP	if_init.h
MSG_2D_SETUP	sim_cig_if.h
MSG_3ROTATIONS	sim_cig_if.h
MSG_ADD_TRAJ_TABLE	sim_cig_if.h
MSG_AGL	if_cig2sim.h
MSG_AGL	sim_cig_if.h
MSG_AGL_SETUP	sim_cig_if.h
MSG_AIRVEH_STATE	sim_cig_if.h
MSG_AMMO_DEFINE	sim_cig_if.h
MSG_ASID_OTHERVEH_STATE	sim_cig_if.h
MSG_ASID_SHOW_EFFECT	sim_cig_if.h
MSG_ASID_STATICVEH_STATE	sim_cig_if.h
MSG_CANCEL_ROUND	sim_cig_if.h
MSG_CGN_CONFIGTREE	sim_cig_if.h
MSG_CIG_CTL	if_cig_ctl.h
MSG_CIG_CTL	sim_cig_if.h
MSG_COLLISION	if_cig2sim.h
MSG_CREATE_CONFIG_NODE	sim_cig_if.h
MSG_CREATE_CONFIGNODE	if_init.h
MSG_DELETE_TRAJ_TABLE	sim_cig_if.h
MSG_DR11_PKT_SIZE	if_cig_ctl.h
MSG_DR11_PRT_SIZE	sim_cig_if.h

User Defined TypeWhere Typedef Defined

MSG_END	if_cig_ctl.h
MSG_EO	if_phase_out.h
MSG_FILE_DESCR	if_tst_ctl.h
MSG_FILE_DESCR	sim_cig_if.h
MSG_FILE_STATUS	if_tst_ctl.h
MSG_FILE_STATUS	sim_cig_if.h
MSG_FILE_XFER	if_tst_ctl.h
MSG_FILE_XFER	sim_cig_if.h
MSG_GEN_CONFIGTREE	if_init.h
MSG_GENVEH_STATE	if_phase_out.h
MSG_GENVEH_STATE	sim_cig_if.h
MSG_GO	sim_cig_if.h
MSG_GUN_OVERLAY	sim_cig_if.h
MSG_HDR	if_cig_ctl.h
MSG_HDR	sim_cig_if.h
MSG_HIT	if_cig2sim.h
MSG_HIT	sim_cig_if.h
MSG_HIT_RETURN	sim_cig_if.h
MSG_HPRXYZS_MATRIX	sim_cig_if.h
MSG_LASER_RETURN	if_cig2sim.h
MSG_LASER_RETURN	sim_cig_if.h
MSG_LOCAL_TERRAIN	if_cig2sim.h
MSG_LOCAL_TERRAIN	sim_cig_if.h
MSG_LT_PIECE	sim_cig_if.h
MSG_M1VEH_STATE	if_phase_out.h
MSG_M1VEH_STATE	sim_cig_if.h
MSG_M2_VEH_STATE	if_phase_out.h
MSG_M2VEH_STATE	sim_cig_if.h
MSG_MISS	sim_cig_if.h
MSG_OBSCURE	sim_cig_if.h
MSG_OTHERVEH_STATE	sim_cig_if.h
MSG_OVERLAY_SETUP	if_init.h
MSG_OVERLAY_SETUP	sim_cig_if.h
MSG_PASS_BACK	if_cig2sim.h
MSG_PASS_BACK	sim_cig_if.h
MSG_PASS_ON	sim_cig_if.h
MSG_PROCESS_ROUND	sim_cig_if.h
MSG_REQUEST_LASER_RANGE	sim_cig_if.h
MSG_RETURN_POINT_INFO	if_cig2sim.h
MSG_ROT_2x1_MATRIX	sim_cig_if.h
MSG_ROUND_FIRED	sim_cig_if.h
MSG_RTN_LT	if_tst_ctl.h
MSG_RTN_LT	sim_cig_if.h
MSG_RTS4x3_MATRIX	sim_cig_if.h
MSG_SCALE	sim_cig_if.h
MSG_SHOW_EFFECT	sim_cig_if.h
MSG_STATICVEH_REM	sim_cig_if.h
MSG_STATICVEH_STATE	sim_cig_if.h
MSG_SYS_ERROR	if_cig_ctl.h
MSG_SYS_ERROR	sim_cig_if.h
MSG_TARGET_ENVIROMENT	if_cig2sim.h
MSG_TERRAIN_FEFDBACK	if_cig2sim.h

<u>User Defined Type</u>	<u>Where Typedef Defined</u>
MSG_TERRAIN_FEEDBACK_POINT_INIT	if_init.h
MSG_TERRAIN_FEEDBACK_SETUP	if_init.h
MSG_TEST_NAME	if_tst_ctl.h
MSG_TEST_NAME	sim_cig_if.h
MSG_TF_HDR	if_cig2sim.h
MSG_TF_PT	if_cig2sim.h
MSG_TRAJ_CHORD	sim_cig_if.h
MSG_TRAJ_ENTRY	sim_cig_if.h
MSG_TRAJ_ENTRY_XFER	if_init.h
MSG_TRAJ_ENTRY_XFER	sim_cig_if.h
MSG_TRAJ_TABLE_XFER	if_init.h
MSG_TRAJ_TABLE_XFER	sim_cig_if.h
MSG_TRANSLATION	sim_cig_if.h
MSG_VIEW_FLAGS	sim_cig_if.h
MSG_VIEW_MAGNIFICATION	sim_cig_if.h
MSG_VIEW_MODE	sim_cig_if.h
MSG_VIEWPORT_STATE	if_init.h
MSG_VIEWPORT_STATE	sim_cig_if.h
MSGS_BLK	sim_cig_if.h
MTXUNION	if_header_struct.h
MTXUNION	sim_cig_if.h
MulticastGroupID	p_assoc.h
MunitionQuantity	basic.h
NetworkAddress	network.h
NetworkBuffer	network.h
NetworkHeader	network.h
NetworkHeader8023	network.h
NetworkPacket	network.h
ObjectType	basic.h
ObjectID	basic.h
ObjectType	p_sim.h
OrganizationalUnit	basic.h
OrganizationType	basic.h
OWN_COLLISIONS	if_targets.h
PARSE_DATA	parser.h (for libparser)
PARSE_TABLE	parser.h (for libparser)
PFI	sim_types.h
PointToPointPDU	p_p2p.h
PointToPointProtocolVersion	p_p2p.h
POT_TYPE	libpfile_dfn.h
PowerSubsystems	status.h
psndr	sersvr.h
qcontrol	ser.h
QueueElement	network.h
R4BBOX2D	dgi_stdg.h
R4BBOX3D	dgi_stdg.h
R4HSL	dgi_stdg.h
R4HSLO	dgi_stdg.h
R4MTX4X4	dgi_stdg.h
R4P2D	dgi_stdg.h
R4P3D	dgi_stdg.h
R4P4D	dgi_stdg.h

User Defined TypeWhere Typedef Defined

R4RGB	dgi_stdg.h
R4RGBO	dgi_stdg.h
R8BBOX2D	dgi_stdg.h
R8BBOX3D	dgi_stdg.h
R8HSL	dgi_stdg.h
R8HSLO	dgi_stdg.h
R8MTX4X3	dgi_stdg.h
R8MTX4X4	dgi_stdg.h
R8P2D	dgi_stdg.h
R8P3D	dgi_stdg.h
R8P4D	dgi_stdg.h
R8RGB	dgi_stdg.h
R8RGBO	dgi_stdg.h
RadarDutyCycle	p_sim.h
RadarMode	p_sim.h
RadiateVariant	p_sim.h
REAL	sim_types.h
REAL_4	mass_stdh.h
REAL_8	mass_stdh.h
REMOTE_OBJECT_CLASS	libfilter.h
RemoteCommandVariant	p_mon.h
RepairCause	p_data.h
RepairRequestVariant	p_sim.h
RepairResponseVariant	p_sim.h
RepairResult	p_sim.h
RepairType	basic.h
reset_req	sersvr.h
RESOLUTION	if_header_struct.h
RESOLUTION	sim_cig_if.h
ResupplyCancelVariant	p_sim.h
ResupplyVariant	p_sim.h
ReturnSwitch	p_data.h
RingElement	network.h
ROT2x1_MTX	if_header_struct.h
ROT2x1_MTX	sim_cig_if.h
ROT_MATRIX	sim_types.h
RTS3x3_MTX	if_header_struct.h
RTS3x3_MTX	sim_cig_if.h
RTS4x3_MTX	if_header_struct.h
RTS4x3_MTX	sim_cig_if.h
RVA_ENTRY	librva.h
S_BUFFER	Section 2.1.2.2.2.117 Vehicles CSCI SDD
serdev	sersvr.h
sersvr_req	sersvr.h
settime_arg	enparg.h
ShellAckVariant	p_mon.h
ShellOpenVariant	p_mon.h
ShellStatus	p_mon.h
ShellStatusVariant	p_mon.h
ShellTextVariant	p_mon.h
ShowEffectVariant	p_data.h
SignalFrequency	p_sim.h

**User Defined Type****Where Typedef Defined**

SignalPower	p_sim.h
SIMNET_M1_Status	stat_m1.h
SIMNET_M2_Status	stat_m2.h
SIMNET_MCC_Status	p_data.h
SIMNET_Sim_Status	p_mgmt.h
simnetFAADStatus	status.h
simnetM1Status	status.h
simnetM2Status	status.h
SimulationAddress	address.h
SimulationPDU	p_sim.h
SimulationPDUKind	p_sim.h
SimulationProtocolVersion	p_sim.h
SimulationStatusVariant	p_data.h
SimulatorType	basic.h
SiteID	address.h
SkyColor	basic.h
SOUND_ELEMENT	sound_dfn.h
SP_ActivateReason	p_sim.h
SP_ActivateRequestVariant	p_sim.h
SP_ActivateResponseVariant	p_sim.h
SP_ActivateResult	p_sim.h
SP_AirframeSubsystems	status.h
SP_AirVehicleSubsystems	status.h
SP_AssociationDataUnit	p_assoc.h
SP_AssociationPDU	p_assoc.h
SP_AssociationPDUKind	p_assoc.h
SP_AssociationProtocolVersion	p_assoc.h
SP_AssociationUserProtocol	p_assoc.h
SP_AttachedVariant	p_stlth.h
SP_AttachVariant	p_stlth.h
SP_BreachedLaneStatusVariant	p_data.h
SP_BreachedLaneVariant	p_sim.h
SP_ChassisSubsystems	status.h
SP_CockpitSubsystems	status.h
SP_CollisionVariant	p_sim.h
SP_ComponentStatus	p_mgmt.h
SP_DamageCause	p_data.h
SP_DataCollectionPDU	p_data.h
SP_DataCollectionPDUKind	p_data.h
SP_DataCollectionProtocolVersion	p_data.h
SP_DeactivateReason	p_sim.h
SP_DeactivateRequestVariant	p_sim.h
SP_DeactivateResponseVariant	p_sim.h
SP_DeactivateResult	p_sim.h
SP_EffectType	p_data.h
SP_ElectronicSubsystems	status.h
SP_elevationRequestPDUKind	p_terra.h
SP_ElevationRequestVariant	p_terra.h
SP_elevationResponsePDUKind	p_terra.h
SP_ElevationResponseVariant	p_terra.h
SP_EquipStatusVariant	p_mgmt.h
SP_ErrorReportSeverity	p_mgmt.h

**User Defined Type****Where Typedef Defined**

SP_ErrorReportVariant	p_mgmt.h
SP_EventFlagVariant	p_data.h
SP_ExerciseStatusVariant	p_data.h
SP_FireResult	p_sim.h
SP_FireType	p_sim.h
SP_FireVariant	p_sim.h
SP_GenericVehicleStatus	status.h
SP_GroundVehicleSubsystems	status.h
SP_ImpactVariant	p_sim.h
SP_IndirectFireDetonation	p_sim.h
SP_IndirectFireVariant	p_sim.h
SP_LaserRangeFinder	p_data.h
SP_LaserRangeResult	p_data.h
SP_LaserRangeVariant	p_data.h
SP_LoggerActivity	p_logger.h
SP_LoggerAvailReplyVariant	p_logger.h
SP_LoggerClockTickVariant	p_logger.h
SP_LoggerCommandVariant	p_logger.h
SP_LoggerInformationVariant	p_logger.h
SP_LoggerMedium	p_logger.h
SP_LoggerOperation	p_logger.h
SP_LoggerPDU	p_logger.h
SP_LoggerPDUKind	p_logger.h
SP_LoggerProtocolVersion	p_logger.h
SP_LoggerRTCType	p_logger.h
SP_LoggerSeekRTC	p_logger.h
SP_LoggerSpeedRTC	p_logger.h
SP_LoggerStartRTC	p_logger.h
SP_LoggerState	p_logger.h
SP_LoggerStatusReplyVariant	p_logger.h
SP_LoggerTime	p_logger.h
SP_ManagementPDU	p_data.h
SP_ManagementPDUKind	p_mgmt.h
SP_ManagementProtocolVersion	p_mgmt.h
SP_MarkerDescriptor	p_sim.h
SP_MarkerVariant	p_sim.h
SP_MarkerVariantNumber	p_sim.h
SP_maxElevations	p_terra.h
SP_maxGenericVehicleStores	status.h
SP_MetamorphoseVariant	p_stlth.h
SP_MimicVariant	p_stlth.h
SP_MineDescriptor	p_data.h
SP_MinefieldVariant	p_data.h
SP_Monitor_PDU	p_mon.h
SP_Monitor_PDUKind	p_mon.h
SP_MonitorKind	p_mon.h
SP_MonitorResponseVariant	p_mon.h
SP_MotiveSubsystems	status.h
SP_MulticastGroupID	p_assoc.h
SP_PointToPointPDU	p_p2p.h
SP_PointToPointProtocolVersion	p_p2p.h
SP_PowerSubsystems	status.h

User Defined TypeWhere Typedef Defined

SP_RadarDutyCycle	p_sim.h
SP_RadarMode	p_sim.h
SP_RadiateVariant	p_sim.h
SP_RemoteCommandVariant	p_mon.h
SP_RepairCause	p_data.h
SP_RepairRequestVariant	p_sim.h
SP_RepairResponseVariant	p_sim.h
SP_RepairResult	p_sim.h
SP_ResupplyCancelVariant	p_sim.h
SP_ResupplyVariant	p_sim.h
SP_ReturnSwitch	p_data.h
SP_ShellAckVariant	p_mon.h
SP_ShellOpenVariant	p_mon.h
SP_ShellStatus	p_mon.h
SP_ShellStatusVariant	p_mon.h
SP_ShellTextVariant	p_mon.h
SP_ShowEffectVariant	p_data.h
SP_SignalFrequency	p_sim.h
SP_SignalPower	p_sim.h
SP_SIMNET_M1_Status	stat_m1.h
SP_SIMNET_M2_Status	stat_m2.h
SP_SIMNET_MCC_Status	p_data.h
SP_SIMNET_Sim_Status	p_mgmt.h
SP_simnetFAADStatus	status.h
SP_simnetM1Status	status.h
SP_simnetM2Status	status.h
SP_SimulationAddress	address.h
SP_SimulationPDU	p_sim.h
SP_SimulationPDUKind	p_sim.h
SP_SimulationProtocolVersion	p_sim.h
SP_SimulationStatusVariant	p_data.h
SP_SiteID	address.h
SP_SpecificStatusCategory	status.h
SP_StatusChangeEffect	p_data.h
SP_StatusChangeVariant	p_data.h
SP_StatusQueryVariant	p_data.h
SP_StatusResponseVariant	p_data.h
SP_StatusResult	p_data.h
SP_StealthAppearanceVariant	p_stlth.h
SP_StealthErrorVariant	p_stlth.h
SP_StealthPDU	p_stlth.h
SP_StealthVisibilityVariant	p_stlth.h
SP_subsystemExists	status.h
SP_SubsystemsCategory	status.h
SP_subsystemStatus	status.h
SP_TeleportVariant	p_stlth.h
SP_TerrainPDU	p_terra.h
SP_TerrainPDUKind	p_terra.h
SP_TerrainProtocolVersion	p_terra.h
SP_terrainProtocolVersionCurrent	p_terra.h
SP_terrainProtocolVersionJan90	p_terra.h
SP_TransactionIdentifier	p_assoc.h



**User Defined Type****Where Typedef Defined**

SP_TurretSubsystems	status.h
SP_UnitRelation	p_data.h
SP_VehicleAppearanceVariant	p_sim.h
SP_vehiclesDynamics	p_stlth.h
SP_VehicleSpecificStatus	status.h
SP_VehicleStatus	status.h
SP_VehicleStatusVariant	p_data.h
SP_VehicleSubsystems	status.h
SP_WeaponSubsystems	status.h
SpecificStatusCategory	status.h
startnp_arg	enparg.h
STATUS_TYPE	libpfile_dfn.h
StatusChangeEffect	p_data.h
StatusChangeVariant	p_data.h
StatusQueryVariant	p_data.h
StatusResponseVariant	p_data.h
StatusResult	p_data.h
StealthAppearanceVariant	p_stlth.h
StealthErrorVariant	p_stlth.h
StealthPDU	p_stlth.h
StealthVisibilityVariant	p_stlth.h
subsystemExists	status.h
SubsystemsCategory	status.h
subsystemStatus	status.h
T_MAT_PTR	sim_types.h
T_MATRIX	sim_types.h
TableControl	table.h
TableEnt	table.h
TARGET_SUPPORTS	if_targets.h
TargetDescriptor	basic.h
TargetType	basic.h
TDB_INFO	tdb.h
TDB_POINT	tdb.h
TDB_STATUS	tdb.h
TDB_THING	tdb.h
TeleportVariant	p_stlth.h
templet_arg	enparg.h
termio	termio.h
TerrainDatabaseID	basic.h
TerrainMap	map.h
TerrainPDU	p_terra.h
TerrainPDUKind	p_terra.h
TerrainProtocolVersion	p_terra.h
terrainProtocolVersionCurrent	p_terra.h
terrainProtocolVersionJan90	p_terra.h
TF1	if_header_struct.h
TF1	sim_cig_if.h
TF2	if_header_struct.h
TF2	sim_cig_if.h
TF_TYPE	if_header_struct.h
Time	basic.h
TIMER	timers_dfn.h

**User Defined Type****Where Typedef Defined**

TransactionIdentifier	p_assoc.h
TurretSubsystems	status.h
type_arg	enparg.h
UnitIdentifier	basic.h
UnitRelation	p_data.h
UnitType	basic.h
VECTOR	sim_types.h
VEH_LIMITS	libfilter.h
VehicleAppearance	libapp.h
VehicleAppearanceVariant	p_sim.h
Vehicleaspsilities	basic.h
VehicleCapabilities	basic.h
VehicleClass	basic.h
VehicleComponent	basic.h
VehicleCoordinates	basic.h
VehicleGuises	basic.h
VehicleID	basic.h
VehicleIDStatus	veh_table.h
VehicleMarking	basic.h
vehiclesDynamics	p_stlth.h
VehicleSpecificStatus	status.h
VehicleStatus	status.h
VehicleStatusVariant	p_data.h
VehicleSubsystems	status.h
VelocityVector	basic.h
version_arg	enparg.h
VNS_1	mass_stdh.h
VNS_2	mass_stdh.h
VNS_4	mass_stdh.h
WeaponSubsystems	status.h
WORD	mass_stdh.h
WorldCoordinates	basic.h
write_req	sersvr.h
XYCoordinates	basic.h
XYZHPR	if_header_struct.h

**APPENDIX E**

The following is a list of globally accessible macros and the files in which they are defined.

<b><u>Macro</u></b>	<b><u>Filename</u></b>
abs	abs.h
abs	sim_macros.h
ASSOC_ADDRESS_EQUAL	assoc.h
between	sim_macros.h
bound	sim_macros.h
BSWAP	libcif.h
BYTE_COUNT	gbuffer.h
CALL	parser.h (for libparser)
CALL1	parser.h (for libparser)
circle_to_mil	trig.h
cntrl	sim_macros.h
CONSTANT	parser.h (for libparser)
CONSTANT_TABLE	parser.h (for libparser)
cube	powers.h
cube	sim_macros.h
DEFINE_TABLE	parser.h (for libparser)
deg_to_mil	sim_macros.h
deg_to_mil	sim_macros.h
deg_to_rad	sim_macros.h
deg_to_rad	sim_macros.h
deg_to_rad	trig.h
DO_KEYWORD_TABLE	parser.h (for libparser)
DOT	gbuffer.h
dtad_device	dtad.h
Dtad_error	dtad.h
Dtad_pull	dtad.h
Dtad_read	dtad.h
Dtad_start	dtad.h
END_FRAGMENT	bdd.h
END_FRAGMENT_MAX	bdd.h
END_OF_DMA_BUFFER	gbuffer.h
eq	sim_macros.h
eq(x,y,z)	tolerance.h
F_REFLECT	compat.h
FIELD	parser.h (for libparser)
FIELD_TABLE	parser.h (for libparser)
FIFO_EMPTY	fifo_dfn.h
FIFO_FULL	fifo_dfn.h
FOREVER	sim_macros.h
frame_delay_of_sound	sim_macros.h
GET_CONTROL(p)	network.h
GET_DATA_PTR(p)	network.h
GET_DSAP(p)	network.h
GET_ETHER_TYPE(p)	network.h
GET_PROTOID(p)	network.h
GET_SSAP(p)	network.h
GETCONSTANT	parser.h (for libparser)

**Macro****Filename**

GETDECIMAL	parser.h (for libparser)
GETFIELDS	parser.h (for libparser)
GETOCTAL	parser.h (for libparser)
GETSTRING	parser.h (for libparser)
GETWORD	ser.h
HELP_PRINT1	sim_macros.h
HELP_PRINT2	sim_macros.h
HEX2	sim_macros.h
HEX3	sim_macros.h
HIWORD	libcif.h
ischar	sim_style.h
iseven	sim_style.h
ishex	sim_style.h
isnum	sim_style.h
isodd	sim_style.h
isprntbl	sim_style.h
iswhite	sim_style.h
KEYWORD	parser.h (for libparser)
KEYWORD_SELECT	parser.h (for libparser)
L_REFLECT	compat.h
L_SWAP	compat.h
LGETHEX	parser.h (for libparser)
LOWORD	libcif.h
mag2	sim_macros.h
mag3	sim_macros.h
max	sim_macros.h
MGMT_HEADER_SIZE	p_size.h
mil_to_circle	trig.h
mil_to_deg	sim_macros.h
mil_to_deg	sim_macros.h
mil_to_rad	sim_macros.h
mil_to_rad	sim_macros.h
mil_to_rad	trig.h
min	sim_macros.h
N-GETPTR	itab.h
N_BUFPTR	itab.h
N_BUFSIZ	itab.h
N_ISLOCKED	itab.h
N_ISNEW	itab.h
N_LOCK	itab.h
N_NUMENTRIES	itab.h
N_SETNEW	itab.h
N_SETOLD	itab.h
N_SETPTR	itab.h
N_UNLOCK	itab.h
NEXT_IN	fifo_dfn.h
NEXT_OUT	fifo_dfn.h
p_arg0	parser.h (for libparser)
PACKET_LENGTH	gbuffer.h
PAGE_ALLIGN	enparg.h
PARSE_FUNCTION	parser.h (for libparser)
PARSE_KEYWORD	parser.h (for libparser)

**Macro****Filename**

parser_init	sec 2.5.2.1.1 in Sim Host CSCI SDD
parser_init	sec 2.5.2.1.1 in Sim Host CSCI SDD
parser_restore_term	sec 2.5.2.1.2 in Sim Host CSCI SDD
parser_restore_term	sec 2.5.2.1.2 in Sim Host CSCI SDD
PATCH_INDEX	tdb.h
PORE	parser.h (for libparser)
PORE_B	parser.h (for libparser)
PORE_L	parser.h (for libparser)
PORE_W	parser.h (for libparser)
potval	sim_macros.h
pr	serioctl.h
PRINT	parser.h (for libparser)
PRINT1	parser.h (for libparser)
PRINT_VID_ERROR	rva_lcc.h Vehicles CSCI SDD
PRINTFIELDS	parser.h (for libparser)
PRO_ASSOC_DATAGRAM_SIZE	p_size.h
PRO_ASSOC_PADDING_HDR_SIZE	p_size.h
PRO_ASSOC_PADDING_SIZE	p_size.h
PRO_ASSOC_REQUEST_HDR_SIZE	p_size.h
PRO_ASSOC_REQUEST_SIZE	p_size.h
PRO_ASSOC_RESPONSE_SIZE	p_size.h
PRO_DATA_EXERCISE_STATUS_SIZE	p_size.h
PRO_DATA_SIMULATION_STATUS_SIZE	p_size.h
PRO_DATA_STATUS_CHANGE_SIZE	p_size.h
PRO_DATA_VEHICLE_STATUS_SIZE	p_size.h
PRO_SIM_ACTIVATE_REQUEST	p_size.h
PRO_SIM_APPEARANCE_SIZE	p_size.h
PRO_SIM_DEACTIVATE_REQUEST	p_size.h
PRO_SIM_FIRE_SIZE	p_size.h
PRO_SIM_IND_FIRE_SIZE	p_size.h
PRO_SIM_MARKER_SIZE	p_size.h
PRO_SIM_REPAIR_REQUEST_SIZE	p_size.h
PRO_SIM_RESUPPLY_CANCEL_SIZE	p_size.h
PRO_SIM_RESUPPLY_OFFER_SIZE	p_size.h
PUTARG	parser.h (for libparser)
qnum_to_chnum	ser.h
rad_to_deg	sim_macros.h
rad_to_deg	sim_macros.h
rad_to_deg	trig.h
rad_to_mil	sim_macros.h
rad_to_mil	sim_macros.h
rad_to_mil	trig.h
radians_to_simnet_angle	libapp.h
readq	ser.h
REPORT_ERROR	gbuffer.h
Ringsize_in_chars(size)	network.h
roll_dice	sim_macros.h
SET_CONTROL(p,x)	network.h
SET_DSAP(p,x)	network.h
SET_ETHER_TYPE(p,x)	network.h
SET_PROTOID(p,x)	network.h
SET_SSAP(p,x)	network.h

**Macro****Filename**

shift_args	cigutil.h
sign	sim_macros.h
SIM_ADDRESS_EQUAL	sim_macros.h
SIM_ADDRESSES_EQUAL	sim_macros.h
simnet_angle_to_radians	libapp.h
SINES_GET_COS	sines.h
SINES_GET_SIN	sines.h
SINES_SHIFT_INDEX	sines.h
square	powers.h
square	sim_macros.h
START_FRAGMENT	bbd.h
step	sim_macros.h
step(x,y,z)	tolerance.h
vec_mag2	sim_macros.h
vec_mag3	sim_macros.h
VEHICLE_IDS_EQUAL	sim_macros.h
VEHICLE_IDS_EQUAL	sim_macros.h
W_SWAP	compat.h
writeln	ser.h
xor	sim_macros.h

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